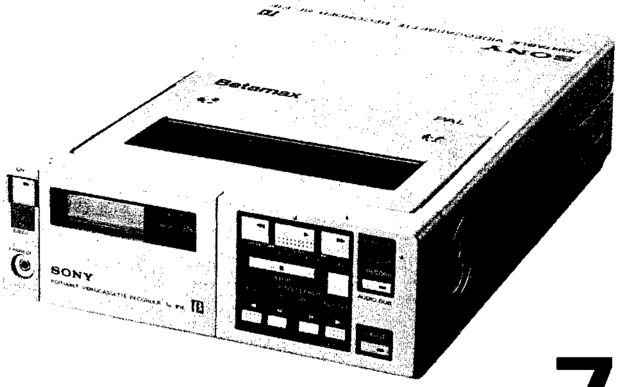
SL-F1E

SERVICE MANUAL

AEP Model
Chinese Model



711P CHASSIS

March, 1982

This manual contains the adjustment manual.

SPECIFICATIONS

System	
Video recording system	Rotary two-head helical scanning
Video signal	CCIR standard, PAL colour
RF output signal	UHF channels 30–39 (variable) 75 ohms, unbalanced
Usable cassettes	Cassettes with the β mark
Tape speed	18.73 mm/sec.
Maximum recording time	2 hours 10 min. (with Sony L-500 cassette) 3 hours 15 min. (with Sony L-750 cassette)
Fast forward/rewind time	Under 3 1/2 min. (with L-500 cassette)
Horizontal resolution	Colour: 260 lines B/W: 300 lines
Video S/N	Colour: Better than 40 dB B/W: Better than 43 dB
Audio frequency response	50 Hz to 10 000 Hz
Audio S/N	Better than 40 dB
Inputs and outputs	
CAMERA connector	14-pin, K-type connector Video in: 1 V p-p ±0.5 V p-p 75 ohms unbalanced, sync negative Video out: 1 V p-p ±0.1V p-p 75 ohm unbalanced, sync negative Audio in: −20 dBs (0 dBs = 0.775 V rms) Audio out: −5 dBs (at load impedance 100 kilohms) output impedance: less than 10 kilohms Power supply output: 12 V dc
ACCESSORY CONNECTOR	26-pin connector Video in: 1 V p-p ±0.5 V p-p 75 ohms unbalanced, sync negative Video out: 1 V p-p ±0.1 V p-p 75 ohms unbalanced, sync negative Audio in: −10 dBs input impedance 100 kilohms Audio out: −5 dBs (at load impedance 100 kilohms) output impedance: less than 10 kilohms Power supply input: 12 V dc
Microphone input	Minijack −60 dBs, for low-impedance microphone
Earpiece output	Minijack −26 dBs, for 8-ohm earpiece
General	
Power requirements	12 V dc ±10%
Power consumption	8.4 W (dc, record mode without camera)
Operating position	vertical or horizontal
Operating temperature	0°C to 40°C (32°F to 104°F)
Storage temperature	−20°C to +65°C (−4°F to +149°F)
Dimensions	Approx: 215 × 80 × 325 mm (w/h/d) (8 1/2 × 3 1/4 × 12 7/8 inches) not incl. projecting parts and controls
Weight	Approx. 4.3 kg (9 lb 8 oz) net

— Continued on next page —

MICROFILM

VIDEO

Beta
β **PORTABLE VIDEO CASSETTE RECORDER**

SONY®

Accessories supplies

Betamax video cassette tape	(1)
75-ohm coaxial cable	(1)
Shoulder strap	(1)
Earpiece	(1)
RF channel adjustment screwdriver	(1)

While the information given is true at the time of printing, small production changes in the course of our company's policy of improvement through research and design might not necessarily be indicated in the specifications. We would ask you to check with your appointed Sony dealer if clarification on any point is required.

Note: Appliance conforms with EEC Directive 76/889 regarding interference suppression.

OPTIONAL ACCESSORIES

Betamax video cassette tape L-250, L-500, L-750
Video head cleaning cassette L-25CL
Rechargeable battery pack NP-1
AC power adaptor AC-F1E
Tuner timer unit TT-F1E
Car battery cord DCC-2500
Colour video camera HVC-2000P, HVC-3000P
Video monitor cable VMC-330
Cable attachment VMC-340
Carrying case LC-330
Carrying handle AH-330
Antenna selector ANS-33

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ADJUSTMENT MANUAL

SECTION 1
GENERAL

PRECAUTIONS

On colour broadcasting systems
This machine is designed to record and play back using the PAL colour standard. Recording and playback of video sources based on other colour systems cannot be guaranteed.

On safety

- Operate the unit only on 12 V dc. For ac operation, use the AC-F1E ac power adaptor (optional) or the TT-F1E tuner timer unit (optional). Do not use any other equipment.
For car battery operation, use the DCC-2500 car battery cord only. Do not use any other car battery cord.
- The nameplate indicating operating voltage, power consumption, etc. is located on the bottom.
- Should any solid object or liquid fall into the cabinet, turn off the unit and have it checked by qualified personnel before operating it any further.

On installation

- Do not install the unit near heat sources such as radiators or air ducts or in a place subject to direct sunlight, excessive dust, or mechanical shock.
- Keep the unit and the cassette away from equipment with strong magnets, as for example, a microwave oven or a large loudspeaker.

On operation

After playing a tape, remove the cassette from its compartment if the unit will not be used for any length of time.

On cleaning

Clean the cabinet, panel and controls with a dry soft cloth, or a soft cloth lightly moistened with a mild detergent solution. Do not use any type of solvent, such as alcohol or benzine, which might damage the finish.

On repacking

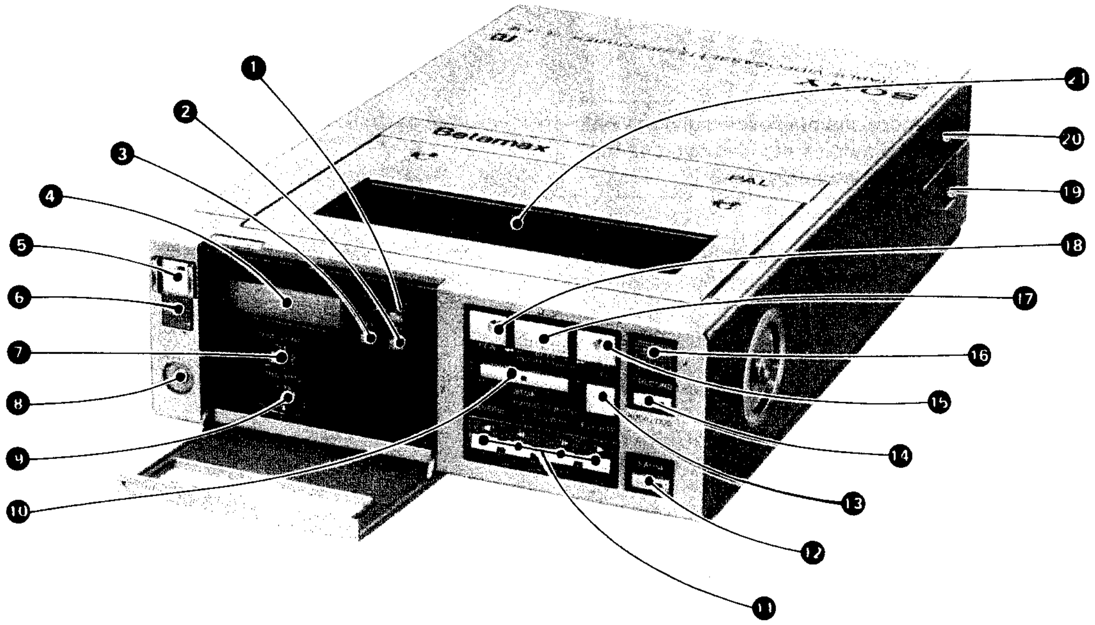
Do not throw away the carton and packing materials. They make an ideal container in which to transport the unit. When shipping the unit to another location, repack it as illustrated on the carton.

If you have any questions about this unit, contact your Sony dealer.

SAFETY-RELATED COMPONENT WARNING !!

COMPONENTS IDENTIFIED BY SHADING AND MARK ⚠ ON THE SCHEMATIC DIAGRAMS, EXPLODED VIEWS AND IN THE PARTS LIST ARE CRITICAL TO SAFE OPERATION. REPLACE THESE COMPONENTS WITH SONY PARTS WHOSE PART NUMBERS APPEAR AS SHOWN IN THIS MANUAL OR IN SUPPLEMENTS PUBLISHED BY SONY. CIRCUIT ADJUSTMENTS THAT ARE CRITICAL TO SAFE OPERATION ARE IDENTIFIED IN THIS MANUAL. FOLLOW THESE PROCEDURES WHENEVER CRITICAL COMPONENTS ARE REPLACED OR IMPROPER OPERATION IS SUSPECTED.

1-1. LOCATION AND FUNCTION OF CONTROLS

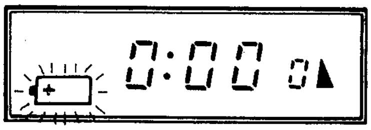


❶ LIGHT button
Press this button to illuminate the time counter for easier reading in the dark.

❷ GO TO ZERO button
Press this button in the stop mode to return the tape to the "0:00 0" point on the time counter.

❸ RESET button
Press to set the time counter to "0:00 0".

❹ Time counter
Indicates in hours, minutes, and 10s of seconds how much the tape has advanced at normal speed.
The "[+]" indication blinks when the battery is about to be exhausted and must be replaced.
The "💧" indication blinks if there is moisture condensation inside the unit.
When the tape runs in the forward direction, "▲" mark blinks and in the reverse direction, "▼" mark blinks.



❺ ON button
Press this button to turn on the power. The lamp will light.
To turn the power off, press this button again.
If a tuner timer unit is connected, the recorder is turned on and off by the switch on the tuner timer unit and this button will not function.

❻ Cassette EJECT button
Press to raise the cassette compartment lid to insert or remove a cassette. This button does not function when the recorder is turned off.

❼ TEST SIGNAL switch
Set to ON to tune your TV receiver to the recorder. You can obtain a black and white pattern from the RF OUT jack of this recorder.

❽ EARPIECE jack
Connect the supplied earpiece here to monitor the sound being recorded during audio dubbing or camera recording.

❾ TRACKING control
If streaks or snow appear in a double speed or a reverse playback picture, or during playback of a cassette recorded by another recorder, adjust this control to obtain the best possible picture. Set to the centre position when playing back cassettes recorded on this recorder.

❿ ■ STOP button
Press to stop the tape.

⓫ SWING SEARCH buttons
These buttons are used for a slow-motion or a frame-by-frame picture. For details, see pages 36–38.

⓬ PAUSE button
Press to stop the tape for a moment during recording or playback. A still picture will be seen during playback and variable-speed playback can be realized using the SWING SEARCH buttons.
Press again to release the pause mode.

⓭ x2 (double-speed) button
Press during playback to obtain a double speed picture.
To resume normal playback, press the ▶ PLAY button or press this button again.

⑭ AUDIO DUB button
Use this button to dub audio onto a previously recorded tape.

⑮ ▶▶ FF (fast-forward) button
Press to advance the tape rapidly. This button is also used for the forward picture-search operation.

⑯ ● RECORD button
While pressing this button, press the ▶ PLAY button to start recording. If you press the PAUSE button while pressing this button, the reocrder will enter the recording pause mode.
When a camera is connected, you can set the unit into the recording pause mode by pressing this button and the ▶ PLAY button. To start recording from the recording pause mode, press the PAUSE button or the tape run/stop button on the camera.

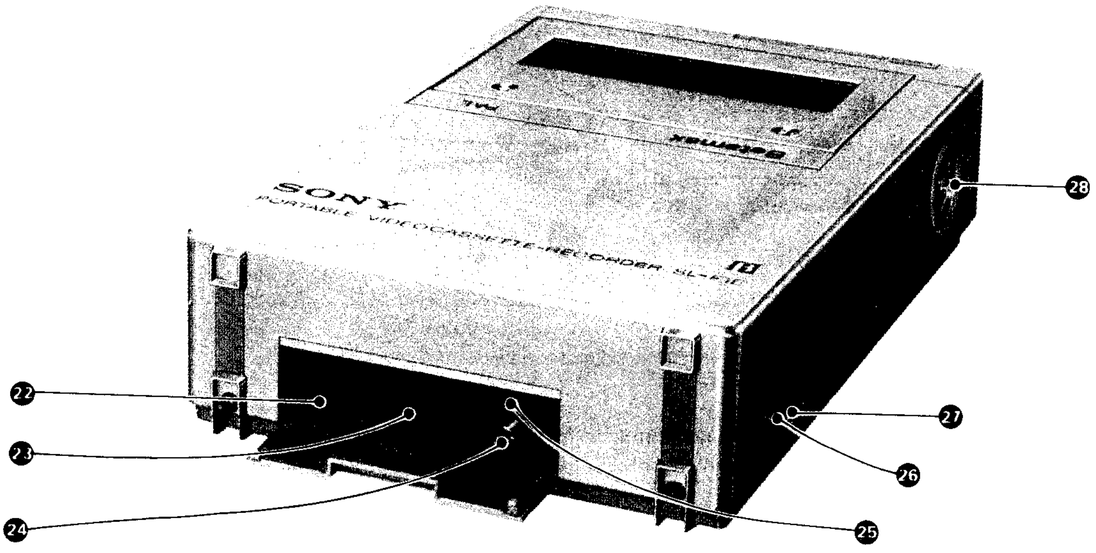
⑰ ▶ PLAY button
Press to play the tape back.

⑱ ◀◀ REW (rewind) button
Press to rewind the tape. This button is also used for the reverse picture-search operation.

⑲ Battery EJECT button
Press to remove the battery pack from its compartment.

⑳ BATTERY compartment
Insert a NP-1 rechargeable battery pack (optional).

㉑ Cassette compartment
Insert the cassette to be recorded on or played back here.



㉒ DC IN jack
Connect an AC-F1E ac power adaptor or the DCC-2500 car battery cord here.

㉓ ACCESSSORY CONNECTOR
Connect a TT-F1E tuner timer unit, a VMC-330 video monitor cable or a VMC-340 cable attachment here.

㉔ RF OUT jack
Connect to the AERIAL IN connector on the TV receiver. The signal of a VTR programme (which is converted into an RF signal) will be supplied to the TV receiver.

㉕ RF CHANNEL screw
If there is interference on the factory preset channel for RF output and the signal of this recorder cannot be displayed clearly on the TV screen, adjust this screw with the adjustment tool (a small screwdriver) supplied.

㉖ CAMERA connector (14-pin, K-type)
Connect a video camera, such as a HVC-3000P or HVC-2000P, here.

㉗ MIC (microphone) jack (minitype)
Connect a microphone here. If your microphone has a phone-type plug, use a plug adaptor.

㉘ Shoudler strap pivot
Attach the supplied shoulder strap here.

1-2. POWER SOURCES

Operate this video cassette recorder on one of the following power sources:

— NP-1 rechargeable battery pack (optional)
— Mains supply using the ac power adaptor AC-F1E (optional)
— Mains supply using the tuner timer unit TT-F1E (optional)
— 12 V car battery using the DCC-2500 car battery cord (optional)

USING THE AC-F1E AC POWER ADAPTOR

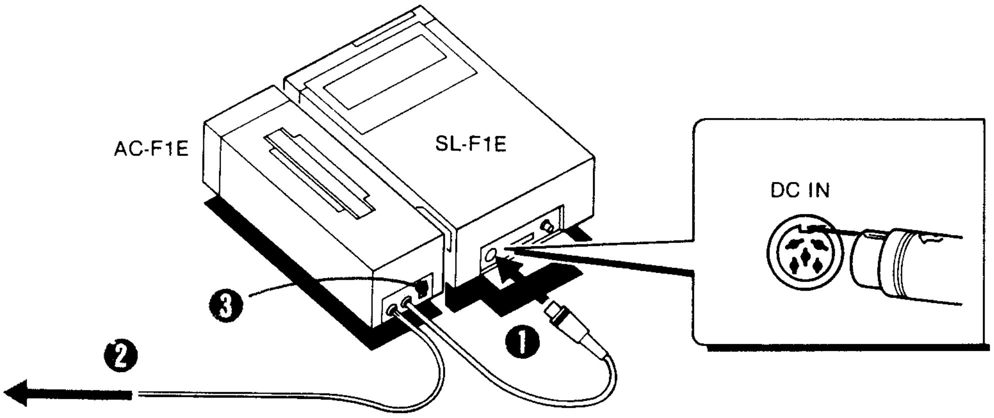
❶ Connect the DC OUT cord of the adaptor to the DC IN jack of the recorder.

- Correctly align the plug and the jack then insert the plug firmly.

❷ Connect the mains lead of the adaptor to a mains outlet.
❸ Set to ON the POWER switch on the rear of the adaptor.

Turning the recorder on and off

— To turn the recorder on, first press the ON/STANDBY button of the ac power adaptor, then the ON button of the recorder.
— To turn it off, simply press the ON/STANDBY button on the ac power adaptor.

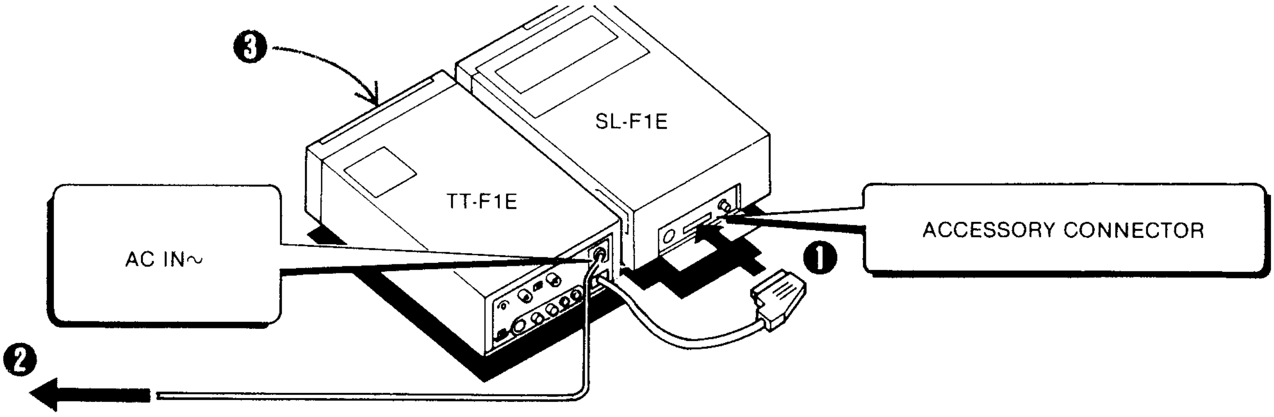


USING THE TT-F1E TUNER TIMER UNIT

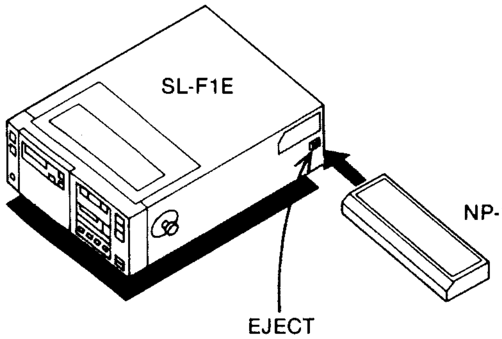
❶ Connect the 26-pin VTR connector of the tuner timer unit to the ACCESSORY CONNECTOR of the recorder. The plug will fit only one way.
❷ Connect the mains lead into a mains outlet.
❸ Depress the POWER switch on the front of the tuner timer unit.

Turning the recorder on and off

The ON button on the tuner timer unit turns the recorder on and off. The ON button on the recorder will not function.



USING THE NP-1 RECHARGEABLE BATTERY PACK



Insert the battery pack into the BATTERY compartment.
The ON button of the recorder turns the recorder on and off.

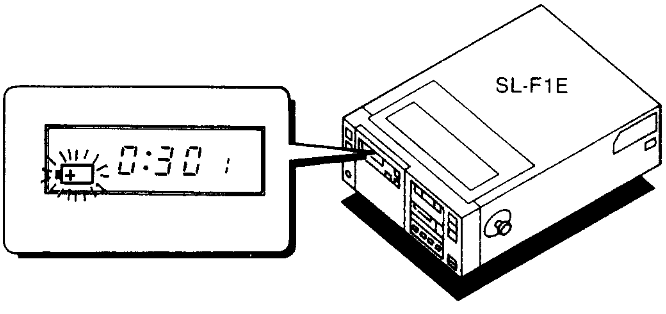
- To remove the battery pack, press the EJECT button just below the battery compartment.

NOTICE: When you operate the recorder on a battery pack, the recorder will be turned off automatically after about 8 minutes in the stop mode, to save the battery pack.

BEFORE OPERATING THE RECORDER, BE SURE TO RECHARGE THE BATTERY PACK

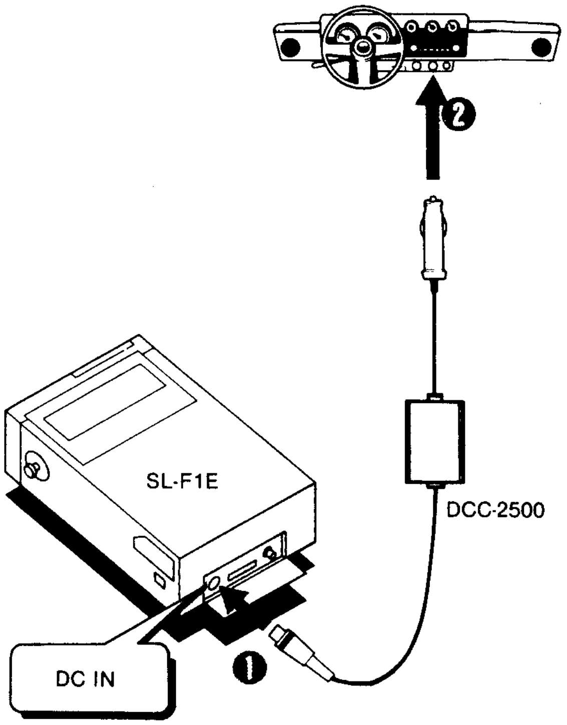
Battery life
At normal temperatures, a fully-charged battery provides 1 hour of continuous operation of both the recorder and the colour video camera.

When to replace the battery pack
The time counter warns you of a discharged battery
If "🔋" mark starts blinking on the time counter, replace the battery pack with a fully-charged one. If you do not, the recorder will be automatically turned off in about 30 seconds.



If you connect a tuner timer unit, an ac power adaptor or a car battery cord, the recorder is operated on external power even if the battery pack remains inserted.

USING THE DCC-2500 CAR BATTERY CORD

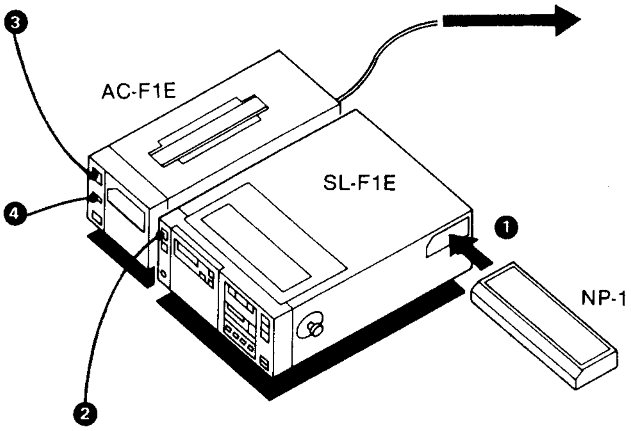


❶ Connect the smaller plug of the car battery cord to the DC IN jack of the recorder. Be sure to align the plug and the jack.
❷ Plug the bigger plug into the cigarette lighter socket of your car. Your car's battery should be 12 V.

- For details, refer to the instruction manual of the DCC-2500.

CHARGING THE BATTERY PACK

Using the ac power adaptor



❶ Insert the battery pack into the recorder.

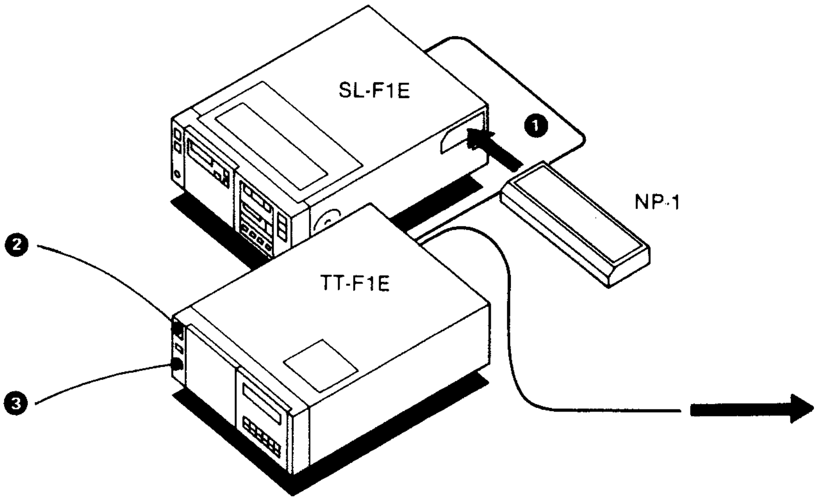
- You can also charge the battery pack by inserting it into the ac power adaptor. If battery packs are inserted into both the recorder and the ac power adaptor, only the battery pack in the ac power adaptor will be charged.

❷ Turn off the power of the recorder so that the ON lamp goes off.

❸ Turn on the ac power adaptor so that the ON lamp lights.

❹ Press the CHARGE button on the adaptor. The VTR lamp (or the ADAPTOR lamp if you inserted the battery into the adaptor) lights and charging begins.

Using the tuner timer unit



❶ Insert the battery pack into the recorder.

❷ Turn off the power by pressing the ON button of the tuner timer unit so that the green lamp goes off.

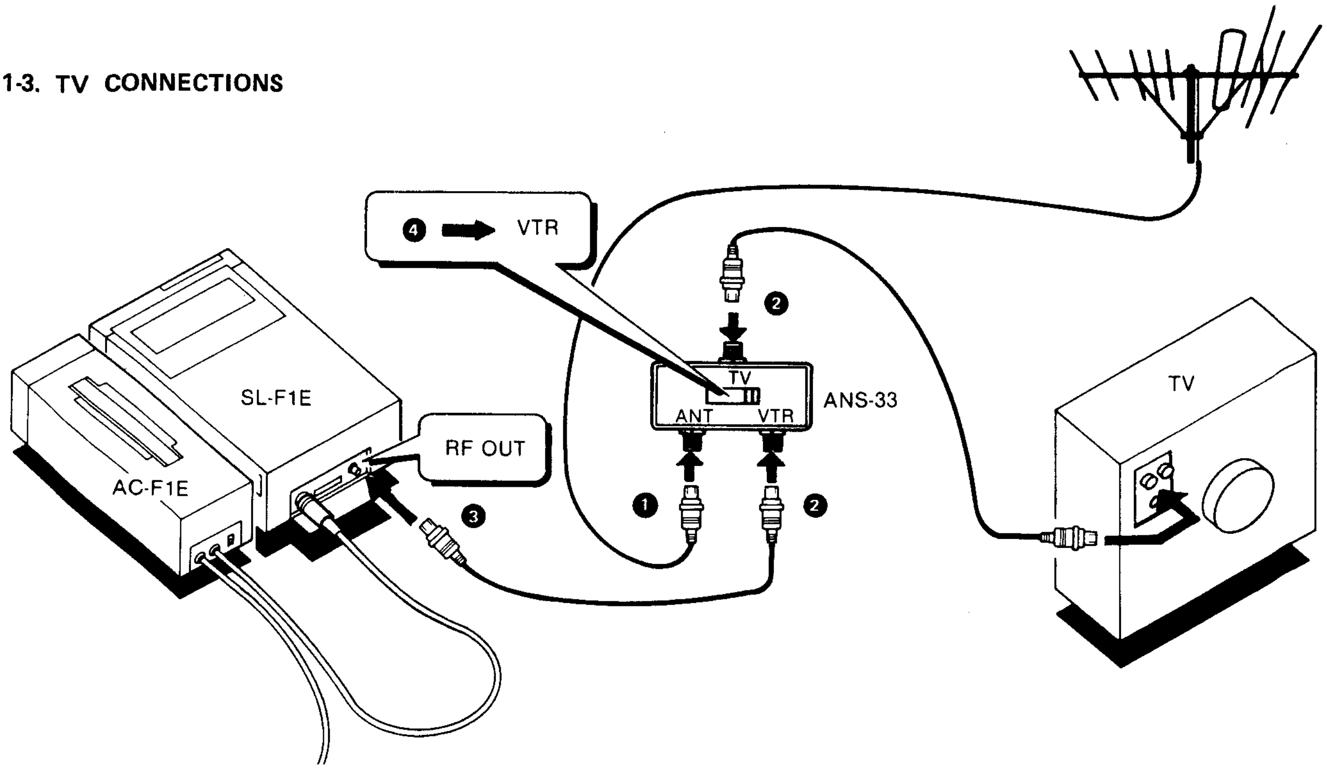
❸ Press the CHARGE button on the tuner timer unit.
The CHARGE lamp lights and charging begins.

The charging time is about 1 hour at normal temperatures. When the battery is fully charged, the charging will stop automatically and the lamp will go off.

Notes

- Do not turn on the recorder while a battery pack is charging.
- The battery pack may not be charged if you try to recharge it immediately after it has been used. If this happens, wait for a few minutes before recharging it.

1-3. TV CONNECTIONS


❹ ➡ VTR
SL-F1E
AC-F1E
RF OUT
❸
TV
ANT
VTR
ANS-33
❶
❷
❷
TV

First unplug your TV from the mains outlet and remove the aerial cable from its socket in the back of the TV.

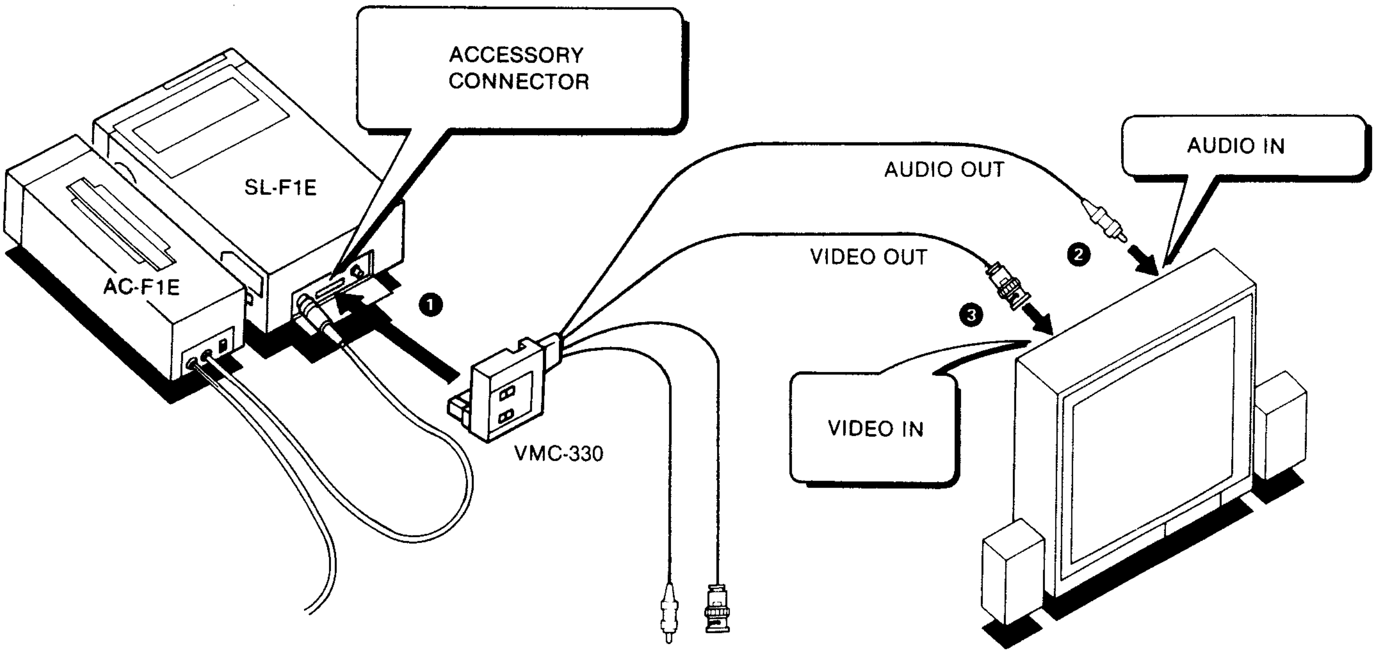
❶ Connect the aerial cable to the ANT connector of the ANS-33 antenna selector (optional).
❷ Connect the TV connector of the ANS-33 to the aerial socket of the TV with a 75-ohm coaxial cable.
❸ Connect the VTR connector of the ANS-33 to the RF OUT connector of the recorder.
❹ Set the switch on the ANS-33 to VTR.
- With this connection, we recommend using an AC-F1E ac power adaptor.

CONNECTING A COLOUR MONITOR TV

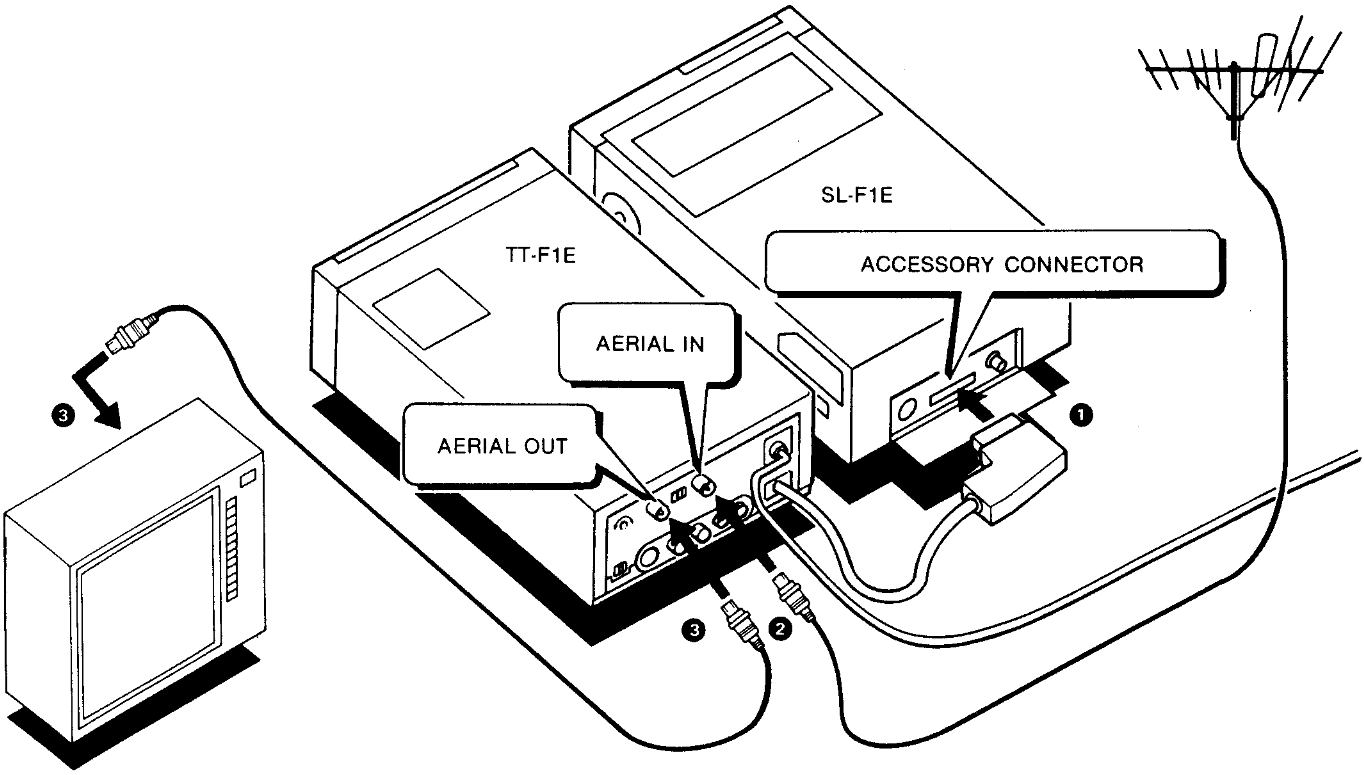
❶ Connect the VMC-330 video monitor cable (optional) to the ACCESSORY CONNECTOR of the recorder.
❷ Connect the AUDIO OUT cord of the VMC-330 to the audio input of the colour monitor TV.
❸ Connect the VIDEO OUT cord to the video input.

- We recommend using the AC-F1E ac power adaptor.
- To connect a system incorporating a tuner timer unit, refer to the instruction manual of the TT-F1E.

With this system, the following TV adjustment is not required.


ACCESSORY CONNECTOR
SL-F1E
AC-F1E
❶
VMC-330
AUDIO OUT
VIDEO OUT
AUDIO IN
❷
❸
VIDEO IN

TV CONNECTION USING A TUNER TIMER UNIT



❶ Connect the VTR connector cable of the tuner timer unit to the ACCESSORY CONNECTOR of the recorder.
❷ Remove the aerial cable from your TV and connect it to the AERIAL IN connector of the tuner timer unit.
❸ Connect the AERIAL OUT connector of the tuner timer unit to the aerial input of the TV using the supplied cable.
The recorder's power is supplied from the tuner timer unit.

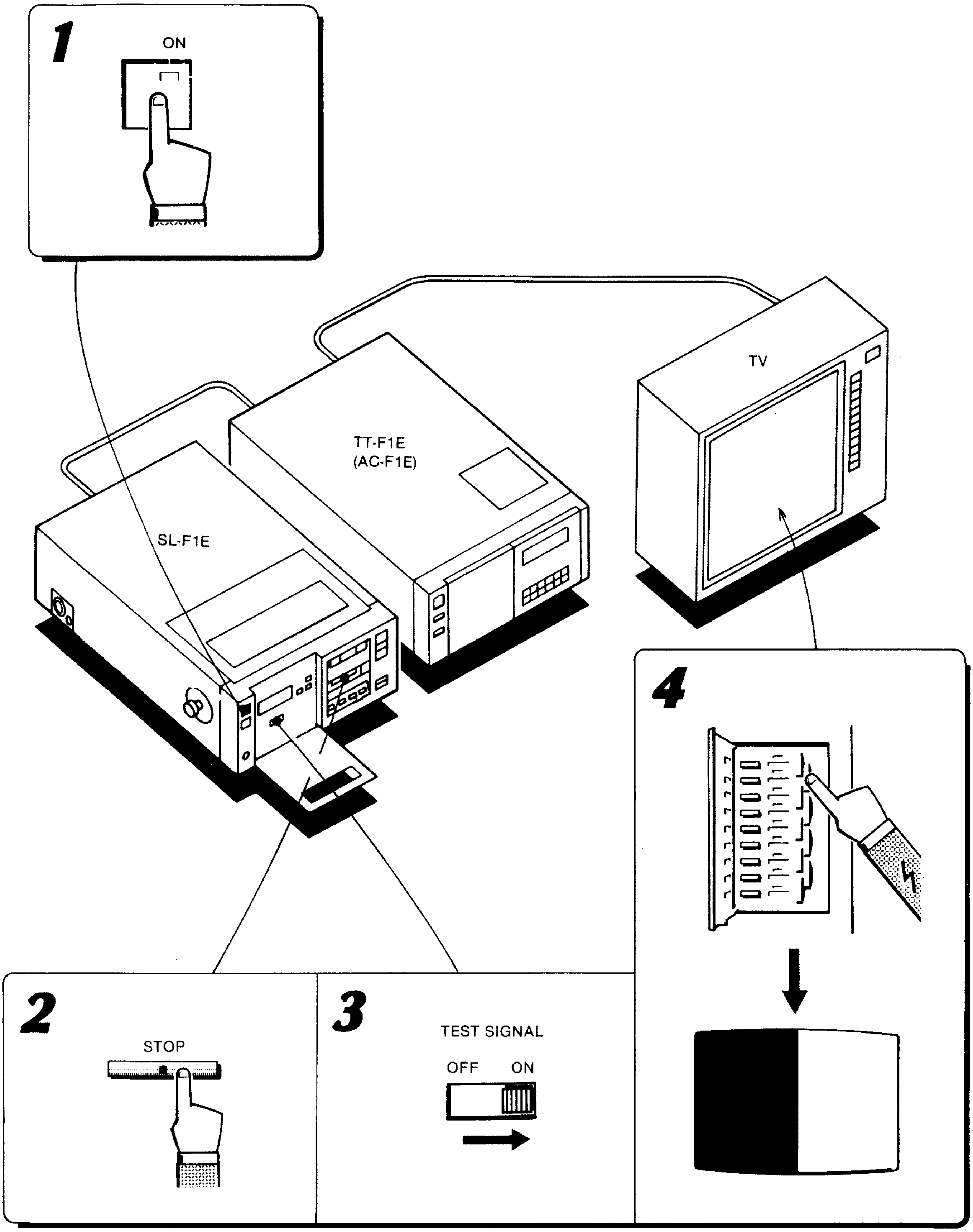
Once one of the above connections have been made, you can view TV programmes in the usual way. To view a video programme, proceed with the TV adjustment

1-4. TV ADJUSTMENT

To view a video programme or the TV programme being recorded on the TV screen, you should adjust the TV receiver so that it is tuned to the signals from the recorder.

❶ After making the connections, turn on the recorder and associated equipment.
❷ Make sure that the recorder is in the stop mode.
❸ Set the TEST SIGNAL switch to ON.
❹ Turn on the TV and select a channel which is not being used to receive a TV station. Tune the channel until you see a clear black and white pattern on the TV screen and you hear a high-pitched tone. This is the recorder's test signal.
● Note that the test signal is transmitted on a channel between UHF channels 30 and 39.
— If you are not sure how to adjust your TV, please refer to the TV's instruction manual or consult your dealer.
If the test picture is free of disturbance, the TV adjustment is complete. Set the TEST SIGNAL switch to OFF.
If the test picture is not free of disturbance, proceed with the adjustment

Whenever you use the video recorder and the tuner timer unit, you should set the TV to the channel selected in the above adjustment.


1
ON
TV
TT-F1E
(AC-F1E)
SL-F1E
4
2
STOP
3
TEST SIGNAL
OFF
ON

If the test picture is not free of disturbance

❶ Reset the TEST SIGNAL switch to OFF.

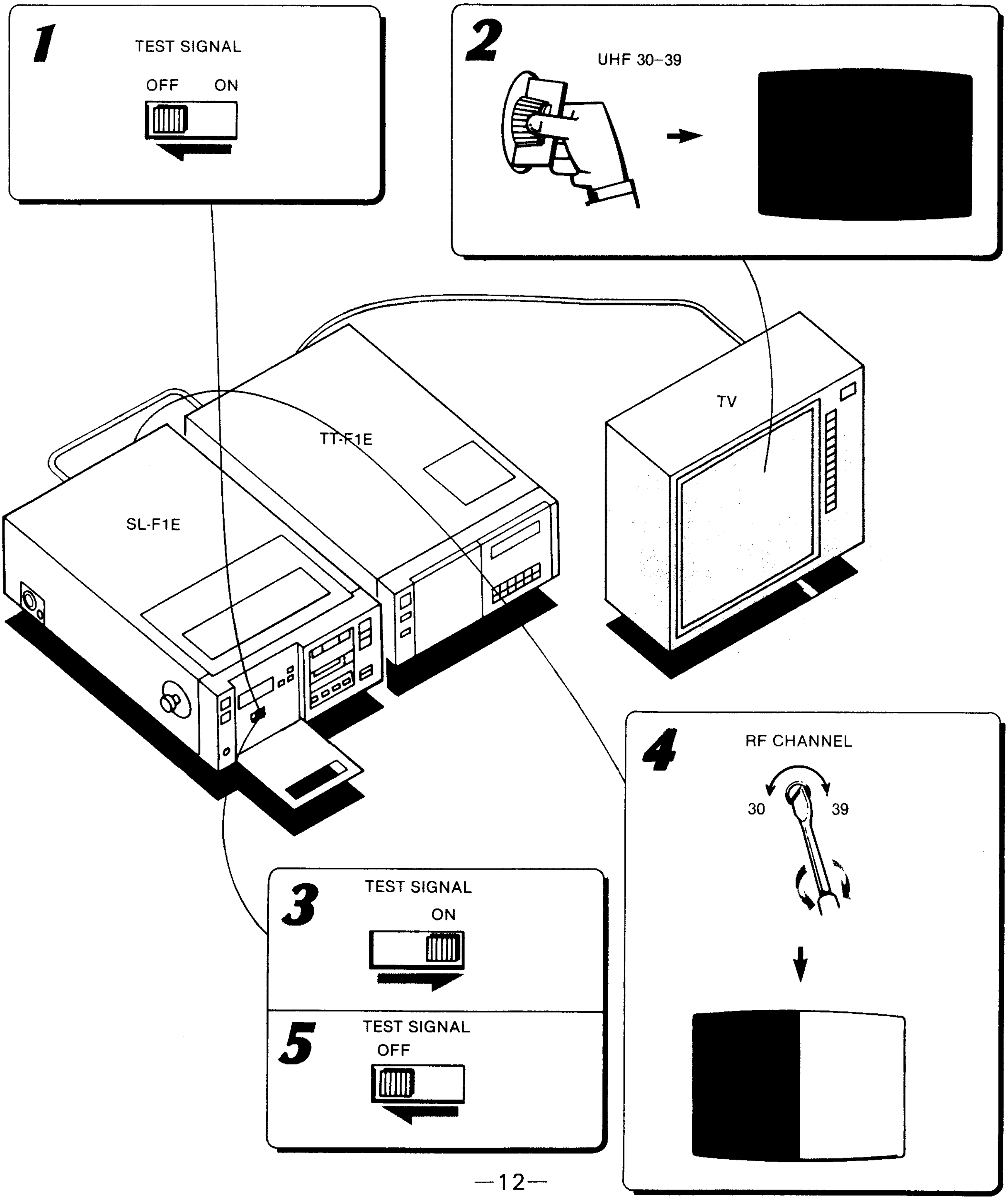
❷ Adjust the channel of the TV to a channel between UHF channels 30 and 39 with the tuning control or the fine tuning control on the TV, so that the TV screen shows only "snow" and so that all you can hear is a steady rustling sound.

❸ Set the TEST SIGNAL switch to ON again.

❹ Slowly turn the RF CHANNEL screw on the back of the recorder if the TV is connected directly to the recorder, or on the back of the tuner timer unit, until you see an undistorted test picture on the TV screen.

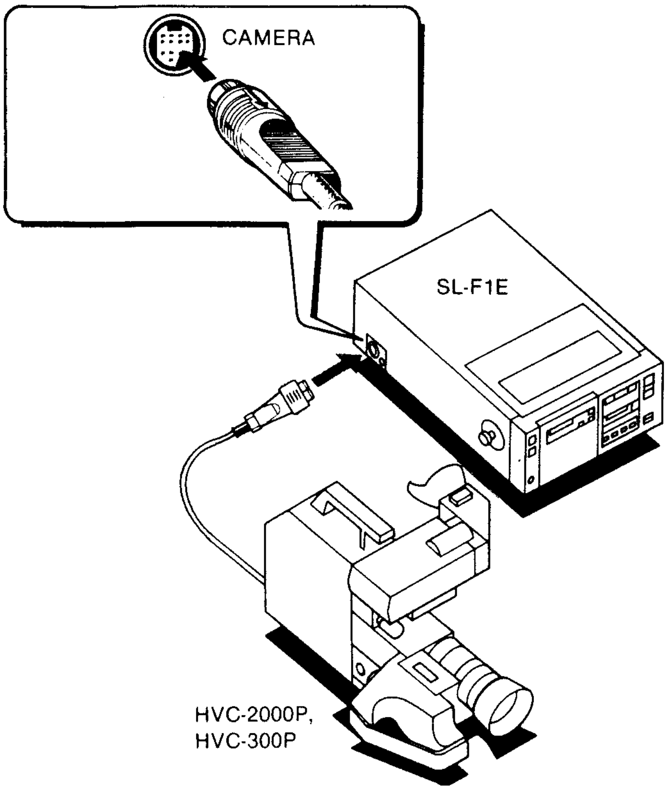
- For this adjustment, use the supplied small screwdriver.

❺ Now the TV adjustment is complete. Reset the TEST SIGNAL switch to OFF.


1
TEST SIGNAL
OFF
ON
2
UHF 30–39
TT-F1E
SL-F1E
TV
4
RF CHANNEL
30
39
3
TEST SIGNAL
ON
5
TEST SIGNAL
OFF

1-5. CAMERA RECORDING

The camera to be connected must conform to the CCIR TV standard (the PAL colour system).



First connect a power source, such as a battery pack or an ac power adaptor, then plug the K-type (14-pin) connector of a Sony HVC-2000P or HVC-3000P video camera into the CAMERA connector

Align the camera's connector with that of the recorder.

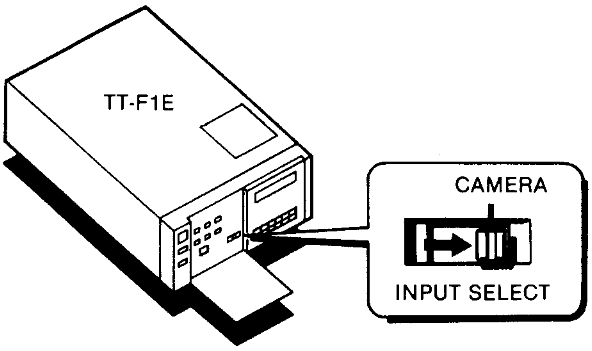
- To disconnect the camera cable, grasp the ring of the connector and pull.

Note

- If you want to use a camera not recommended in this manual, make sure that the power requirement of the camra is DC 12 V and that the power consumption is under 10W. Otherwise, the video cassette recorder will be damaged.

When the TT-F1E tuner timer unit is connected

Be sure to set the INPUT SELECT switch on the tuner timer unit to CAMERA



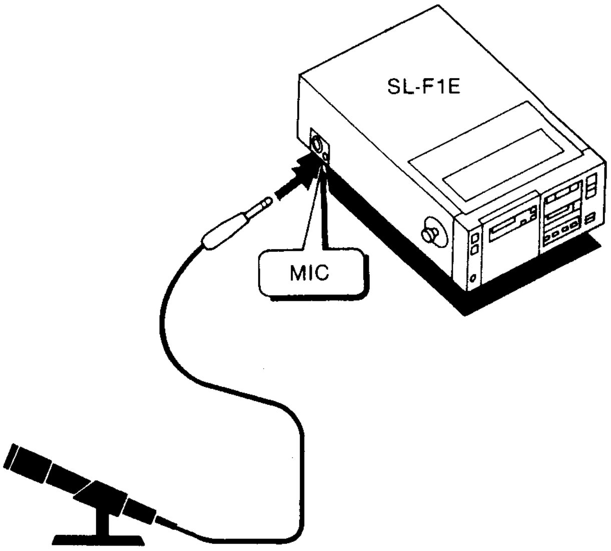
To monitor the scenes being recorded on the TV screen

Connect a TV and set it to the channel preset for the video recorder You cannot monitor, however, if the recorder is being powered by an NP-1 battery pack. In this case, connect a video monitor or a TV receiver equipped with audio and video line inputs with a VMC-330 video monitor cable

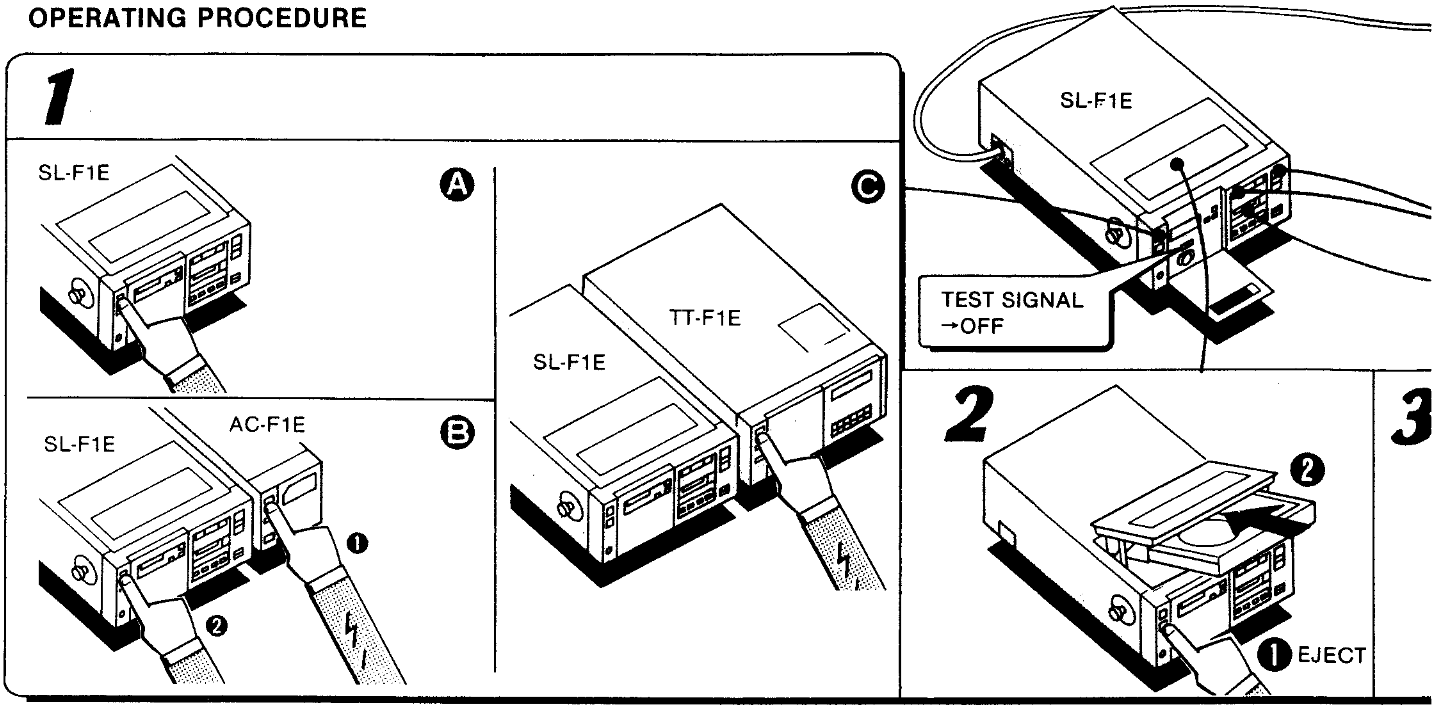
To record the sound from an external microphone

Plug a microphone into the MIC jack on the recorder

The microphone built into the camera will be disconnected. If your microphone has a phone plug, use a plug adaptor such as a Sony PC-1A (optional).



OPERATING PROCEDURE



❶ Turn on the power.
— When using with a battery pack, simply press the ON button on the recorder (case A).
— When using with an ac power adaptor, press the ON buttons on both the adaptor and the recorder (case B).
— When using with a tuner timer unit, press the ON button on the tuner timer unit (case C).

❷ Press the EJECT button and insert a cassette with the round window to the left.

❸ While holding the ● RECORD button depressed, press the ▶ PLAY button. The recorder will be set into the recording pause mode.

❹ Make the necessary adjustments on the camera. For details, refer to the camera's instruction manual.

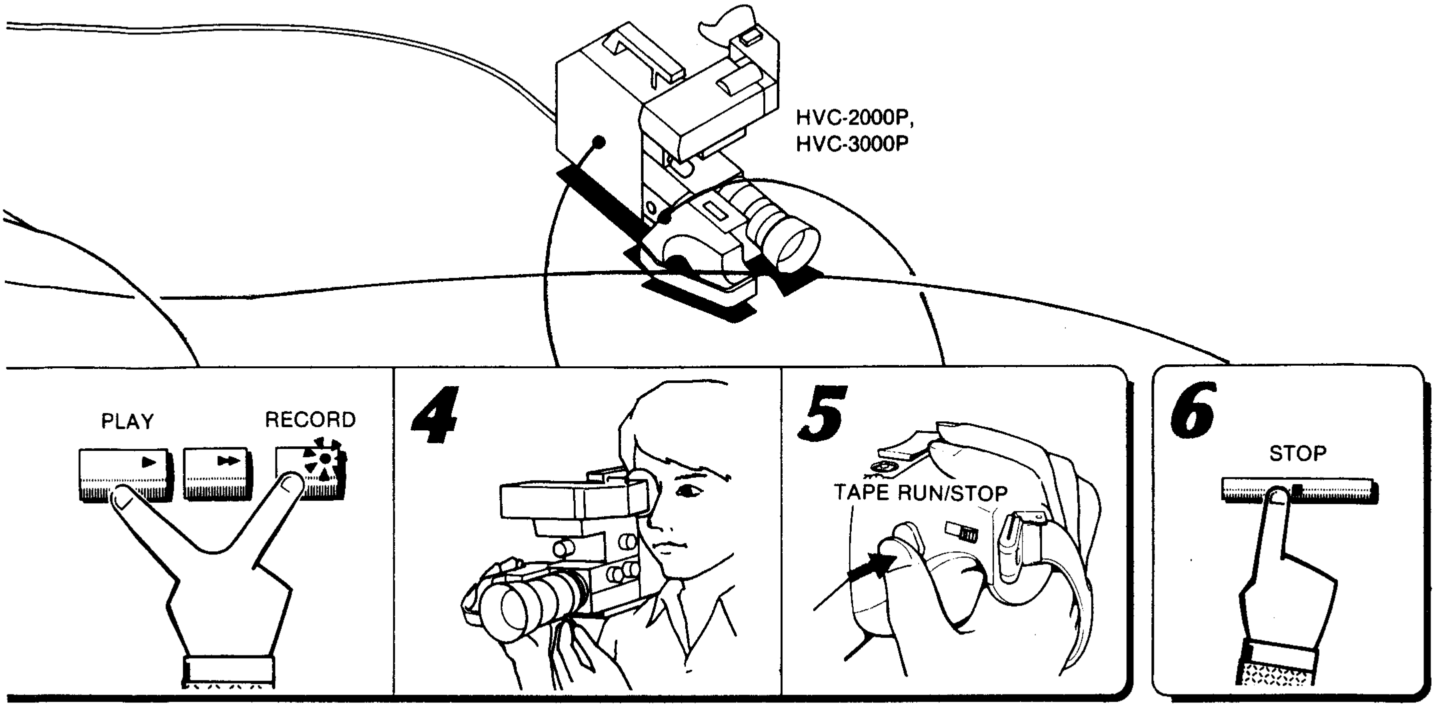
- Before starting recording, make sure that the TEST SIGNAL switch on the recorder is set to OFF. If it remains ON, the test signal will be recorded even though you can view, on the viewfinder, the scenes you want to record.

❺ To start recording, press the tape run/stop button on the camera.

❻ To stop recording, press the ■ STOP button.
When the tape reaches the end, it will be rewound to the beginning.

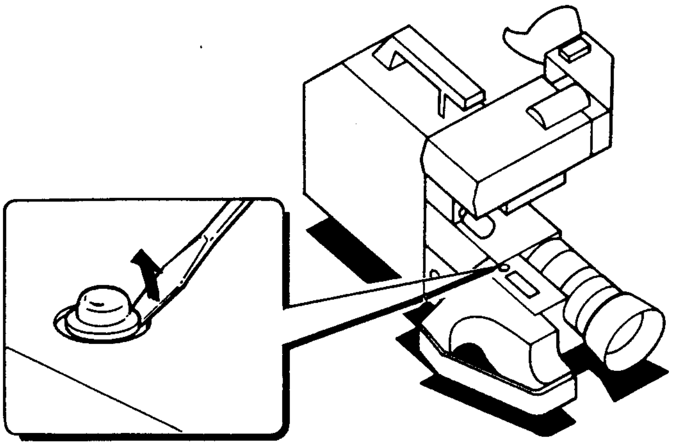
To stop the tape momentarily
Press the tape run/stop button on the camera or the PAUSE button on the recorder. To start recording again, press this button again.
Automatic release: The pause mode will be automatically released after about 8 minutes to protect the video heads and the tape. The recorder will then stop if it is being powered by a battery pack, or the record mode will be resumed if the recorder is used with another power source.

To record a tape which is to be played back from the very beginning of the tape on another recorder, run the tape for about 15 seconds before starting recording. Otherwise, you may miss the starting point during playback on the other machine.



If you use a camera with a recording review function, such as the Sony HVC-3000P and HVC-2000P*, you can check whether the recording has been made correctly immediately after you have set the recorder into the recording pause mode.
Press the recording review button in the recording pause mode. The last few seconds of the recorded scene will be played back on the viewfinder. The recorder will then enter the recording pause mode at the point where the recording review button was pressed.
To restart recording, press the tape run/stop button on the camera.

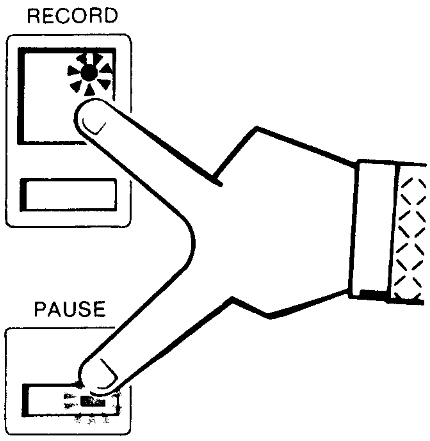
*** For customers who have a HVC-3000P or HVC-200P**
The small projection located near the zoom switch is the recording review button. If this button is covered with a plastic cap, carefully remove the cover over the button with a screwdriver or similar



HOW TO RECORD WITH SMOOTHER TRANSITIONS BETWEEN SCENES

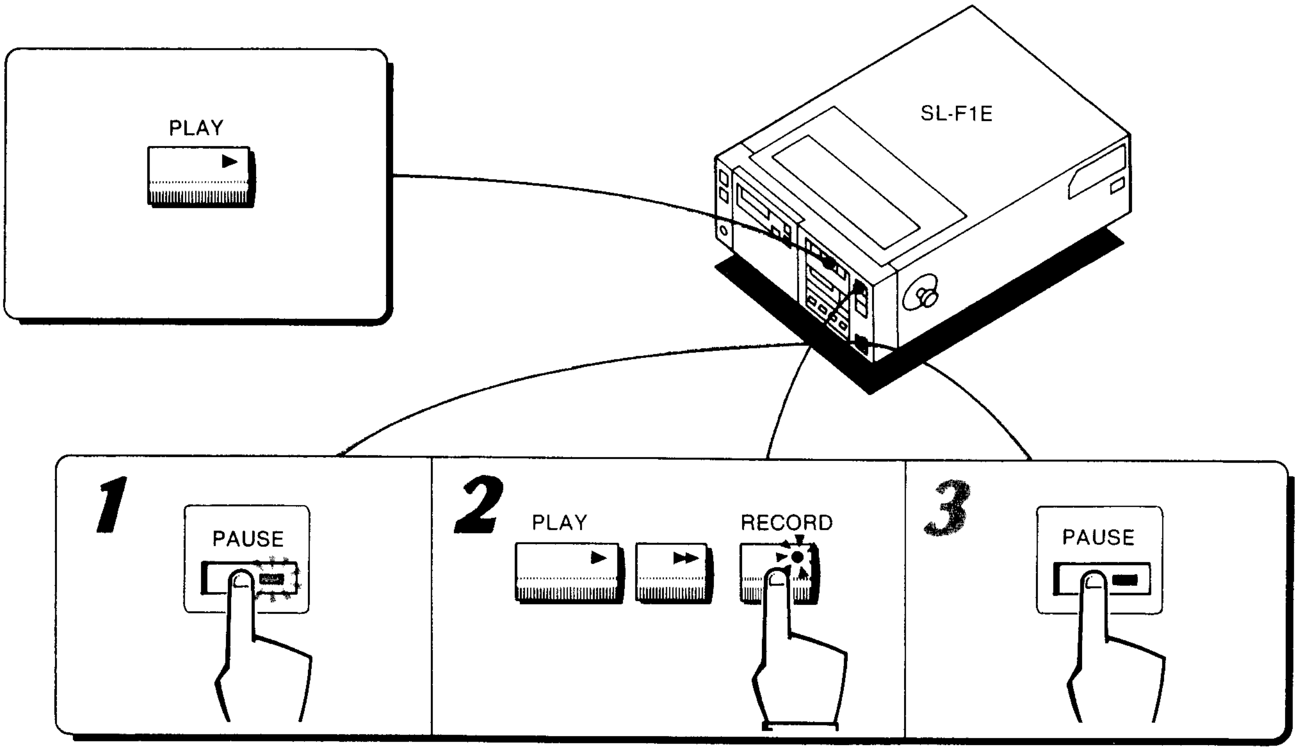
The picture transition between scenes will be smoother if you start recording after first setting the recorder in the recording pause mode, even if you use the ■ STOP button to stop recording or if you turn off the recorder between scenes.

To set the recorder into the recording pause mode:
When recording with a camera, simply press the ● RECORD and ▶ PLAY buttons
When recording TV programmes, press the ● RECORD and PAUSE buttons simultaneously To start recording, press the PAUSE button again.



You can start recording at any point even from the playback mode.
❶ Stop the tape at the point which you want to start recording the next scene by pressing the PAUSE button.
❷ Press the ● RECORD button. The recorder will be set to the recording pause mode.
❸ Press the PAUSE button again. Recording will begin.

Why is picture transition smoother when recording is started from the recording pause mode?
When the recorder enters the recording pause mode, the tape will be automatically rewound for about 0.5 second, then stop. When the pause mode is released to start recording, the tape runs in the playback mode to synchronize the segment to be recorded next with the last segment recorded. When the tape reaches the point where the recorder entered the recording pause mode, recording starts.



1-6. TV PROGRAM RECORDING

To record TV programmes, a TT-F1E tuner timer unit is necessary.

❶ Turn on the TV and select the channel preset for the video recorder.

❷ Press the ON button on the tuner timer unit.
The recorder will be turned on simultaneously.

❸ Set the INPUT SELECT switch on the tuner timer unit to TUNER.

❹ Select the channel to be recorded with the tuner timer unit.

❺ Insert a cassette into the recorder with the round window to the left.

❻ While holding the ● RECORD button depressed, press the PLAY button. Recording will begin.

❼ To stop recording, press the ■ STOP button on the recorder.

To stop the tape momentarily, press the PAUSE button. During pause mode, the TV programme can be seen on the TV but the picture will not be recorded.

Automatic release: The pause mode will be released automatically after about 8 minutes and the recorder will revert to the record mode. This is to protect the video heads and the tape.

CAUTION

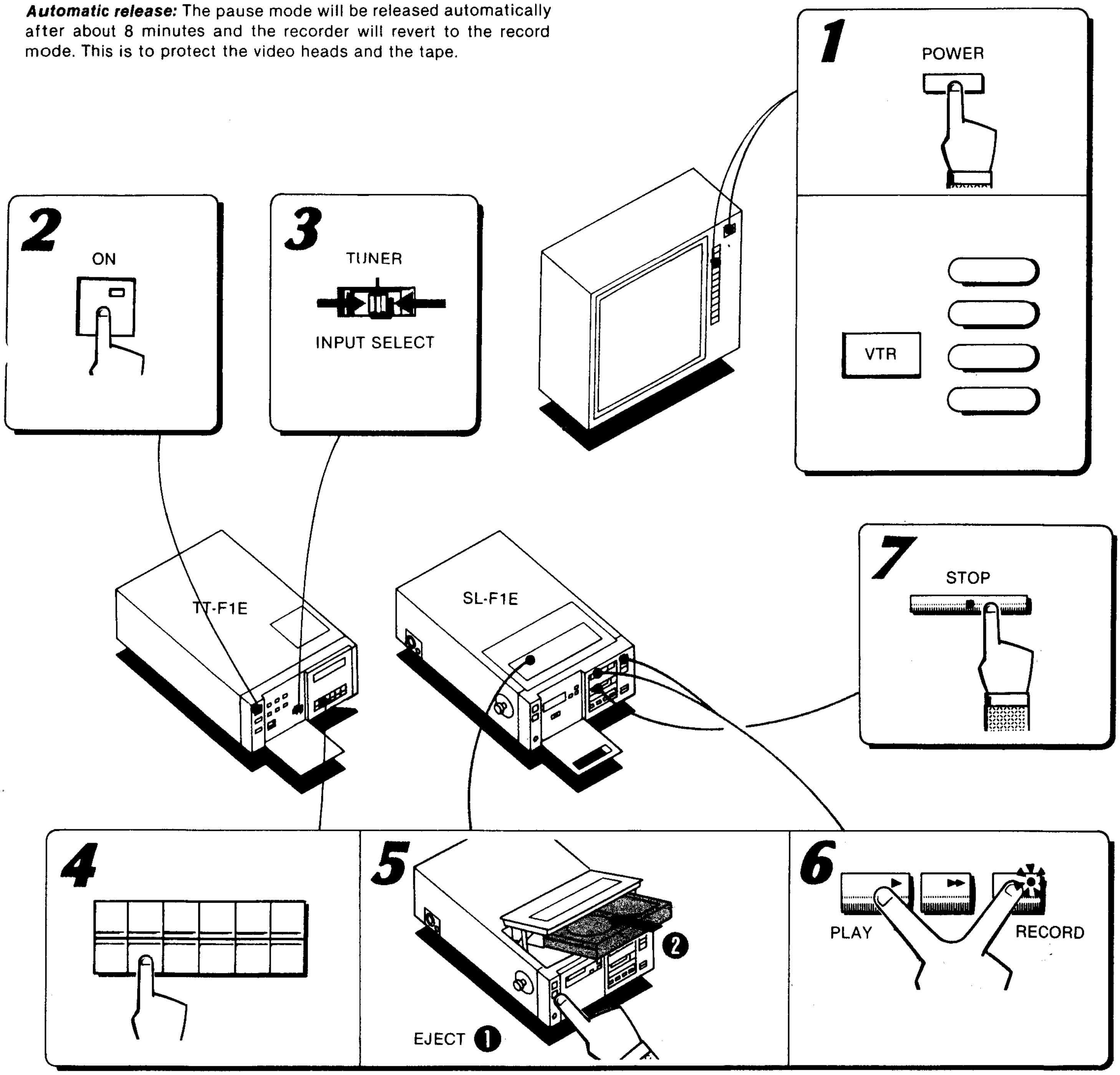
Television programmes, films, video tapes and other materials may copyrighted. Unauthorized recording of such material may be contrary to the provision of the copyright laws.

RECORDING ONE TV PROGRAMME WHILE VIEWING ANOTHER

You can enjoy one TV programme while recording another TV programme as follows:

❶ Start recording the desired TV programme in the usual way.

❷ Select the channel you want to view with the TV's programme selector.

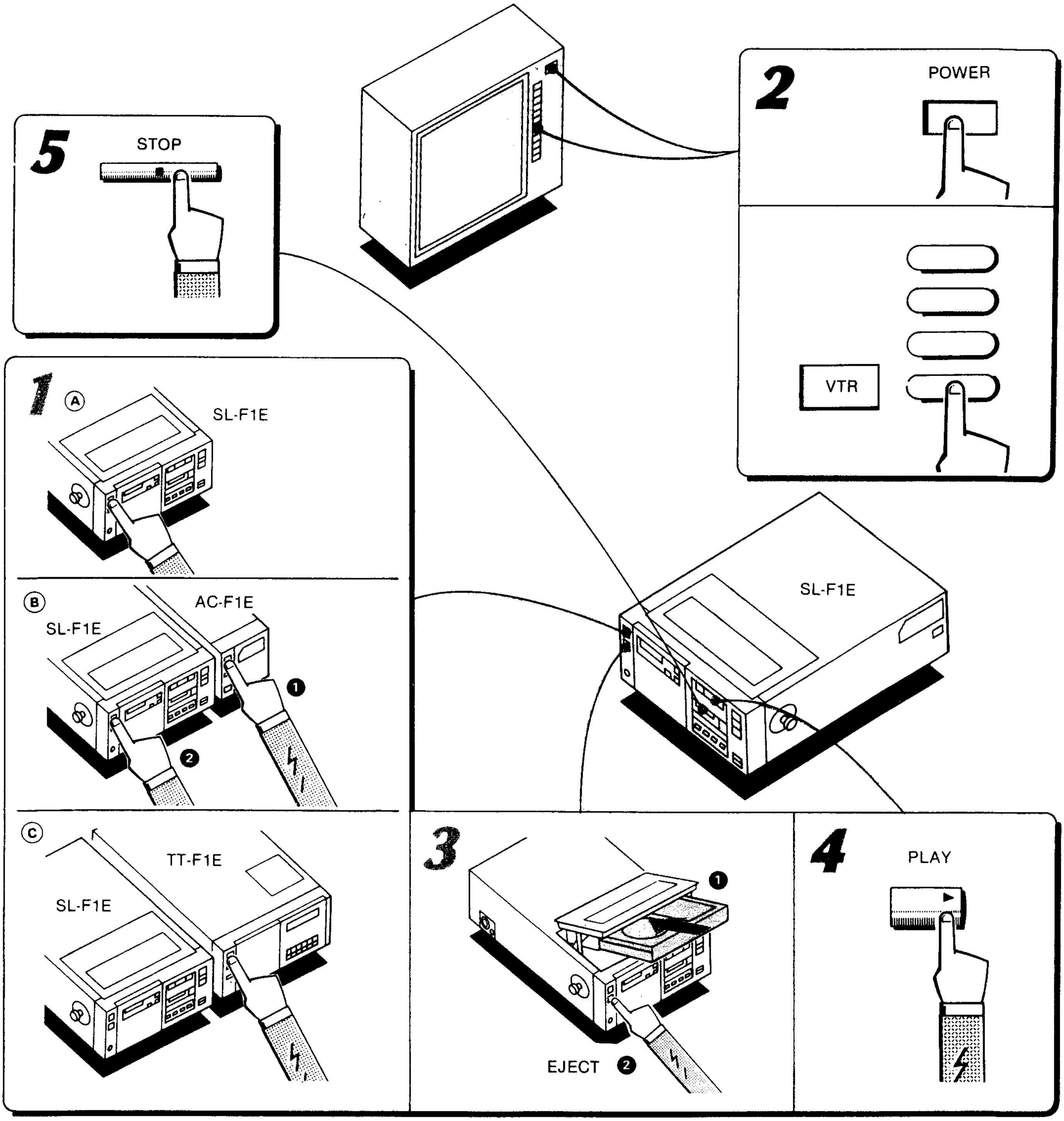


1-7. PLAY BACK

❶ Turn on the recorder and the associated equipment.
❷ Set the TV to the channel preset for the video recorder.
❸ Insert a cassette, with the round window to the left.
- Rewind the tape with the ◀◀ REW button, if necessary.

❹ Press the ▶ PLAY button on the recorder. The lamp lights up and playback begins.
❺ To stop playback, press the ■ STOP button.
When the tape reaches the end, it will be automatically rewound to the beginning.

To playback from the beginning of the tape after rewinding
Press the ▶ PLAY button while holding the ◀◀ REW button depressed during rewinding or in the stop mode
After the tape is completely rewound, the tape will automatically replay.

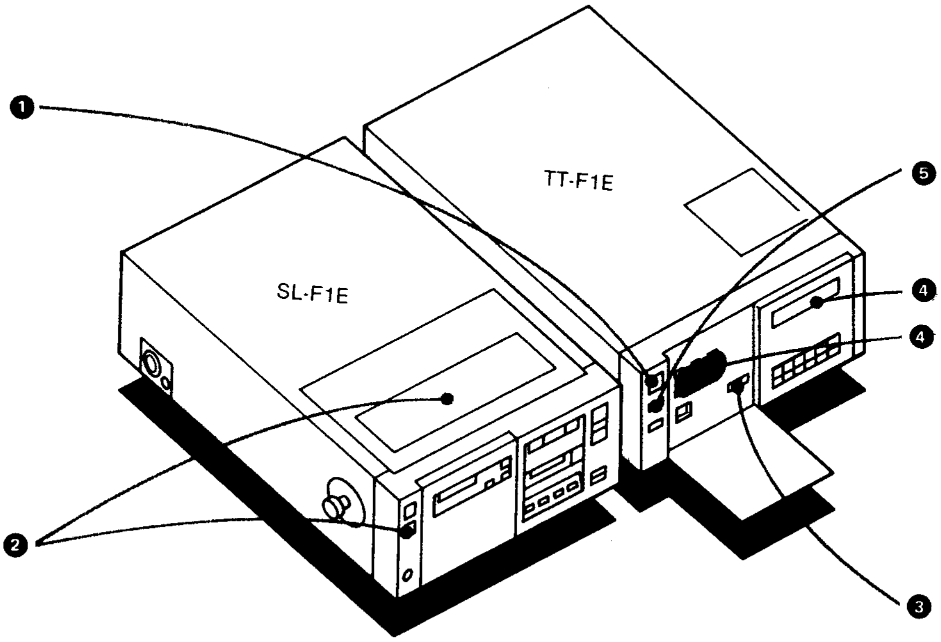

5
STOP
2
POWER
VTR
1
Ⓐ
SL-F1E
Ⓑ
SL-F1E
AC-F1E
❶
❷
Ⓒ
SL-F1E
TT-F1E
SL-F1E
3
❶
EJECT ❷
4
PLAY

1-8. TIMER ACTIVATED RECORDING

Using the TT-F1E tuner timer unit (optional), you can record a TV programme in your absence. Recording may be begun at any time on any day of the next fourteen days and stopped at a predetermined time.
Up to 8 turn-on and turn-off times can be programmed.

POINTS TO CHECK BEFORE STARTING TIMER RECORDING

- Is the tuner timer unit connected correctly?
- Does the cassette to be used have a safety tab on the bottom?
- Is the tape in the cassette long enough to record the desired programmes?



➊ Turn on the tuner timer unit and the recorder.
➋ Insert a cassette.
➌ Set the INPUT SELECT switch of the tuner timer unit to TUNER.
➍ Set the timer programme: event number, turn-on day and time, turn-off time and channel. For details, see the TT-F1E instruction manual.
➎ Press the TIMER REC button so that the red lamp lights.

At the preset turn-on time on the preset day, recording will start automatically and continue to the preset turn-off time or to the tape end, when the recorder will be turned off.

TO OPERATE THE RECORDER OR THE TUNER TIMER UNIT AFTER THE TIMER HAS BEEN SET

Once the TIMER REC button has been pressed, the ON buttons of the tuner timer unit and the recorder will not function. This is to safeguard the timer recording.
To operate the recorder after the timer has been set, press the TIMER REC button again so that the red lamp goes off.

- The timer settings are kept in the memory even if you disengage the TIMER REC button. To restore the setting, press the TIMER REC button again.

WHEN A POWER INTERRUPTION OCCURS

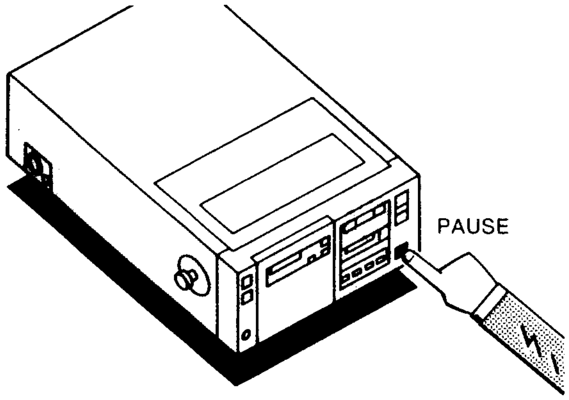
If the clock shows "0:00" of the 1st day and does not advance
all the timer settings have been erased. Reset the clock time and the timer settings.

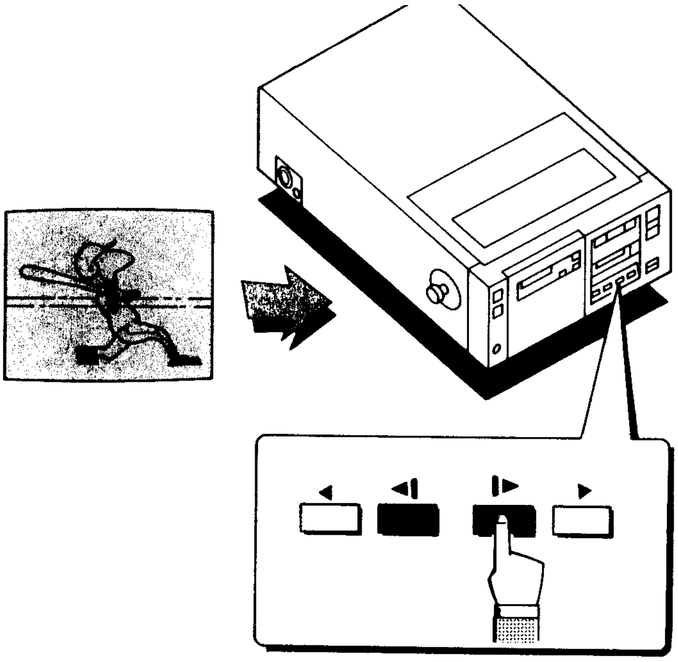
If the clock still shows the correct time...
the power has been interrupted for less than 10 minutes and the clock has been powered by the self-charging battery built into the tuner timer unit so that the timer programmes were kept in the memory. If the interruption occurs after the recording has begun, recording will be resumed when the power is restored.

1-9. TO OBTAIN VARIABLE SPEED PLAYBACK PICTURES

With this recorder, you can obtain a still, a slow motion, a double speed, a frame-by-frame or a reverse playback picture as well as a normal speed playback picture.

STILL PICTURE

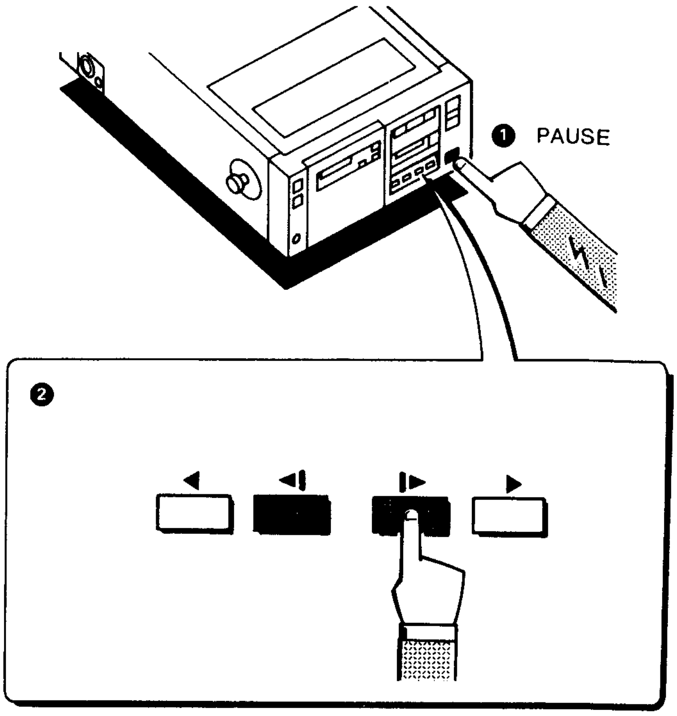




During playback, press the PAUSE button.

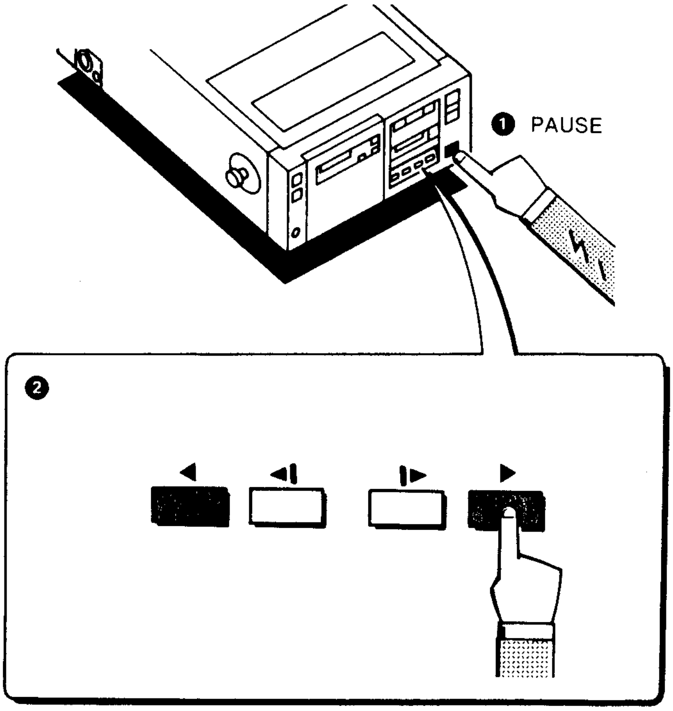
To resume normal playback, press the PAUSE button again.
If a noise band appears, press and release the |▶ or ◀| button a few times until the noise band disappears

SLOW MOTION



❶ During playback, press the PAUSE button.
❷ Keep the |▶ or ◀| button depressing: the |▶ button for forward movement and the ◀| button for reverse movement.
When you release the button, a still picture will be obtained.
To resume normal playback, press the PAUSE button again.

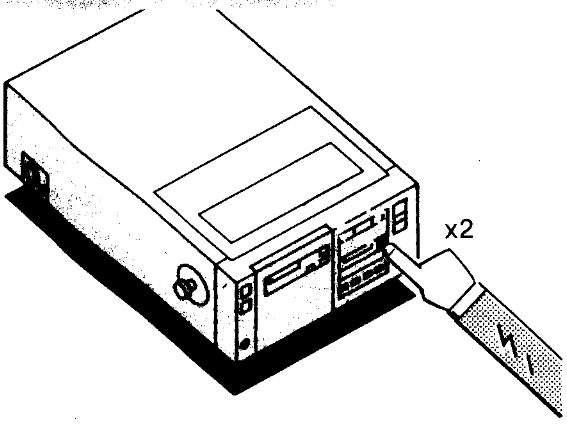
FRAME-BY-FRAME PLAYBACK



❶ During playback, press the PAUSE button.
❷ Repeatedly press and release the ▶ or ◀ button: ▶ for forward movement and ◀ for reverse movement.
To view fast action scenes, use the |▶ or ◀| button.

To resume normal playback, press the PAUSE button again.

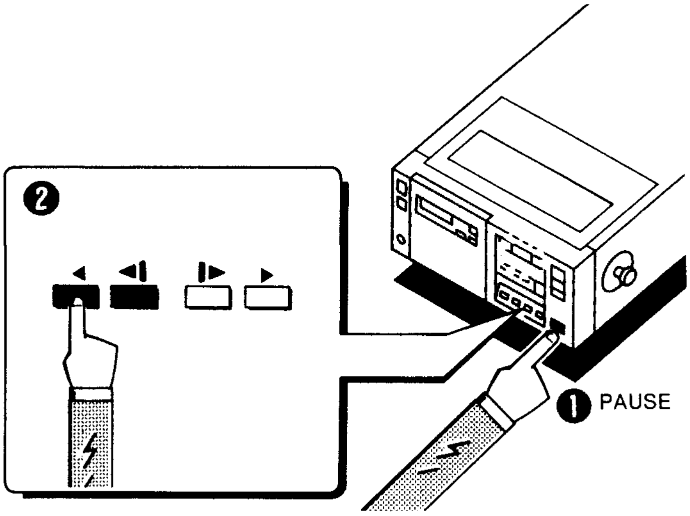
DOUBLE SPEED PICTURE



During playback, press the x2 button.

To resume normal playback, press the x2 button again or the ▶ PLAY button.

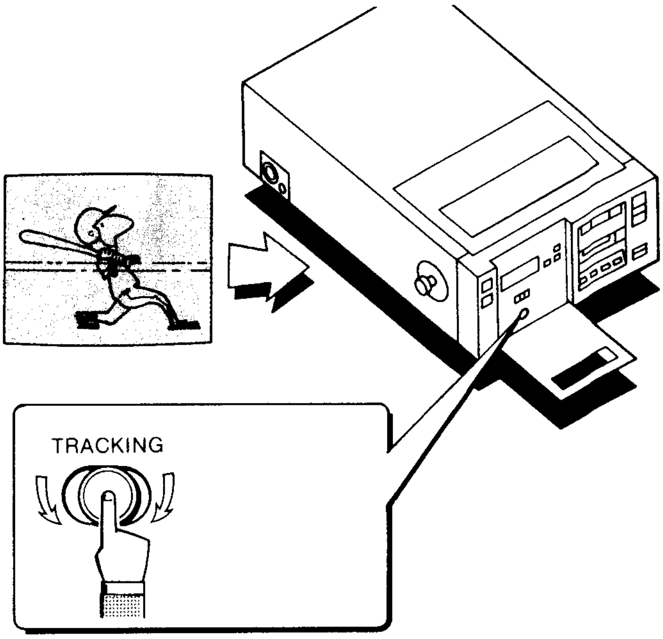
REVERSE PLAYBACK



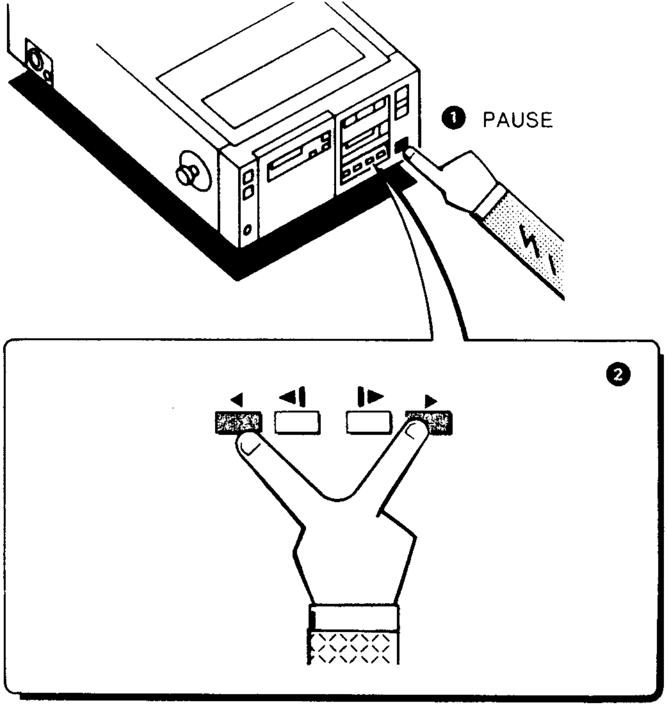
❶ During playback, press the PAUSE button.
❷ Press the ◀ button. When you release the button, the still picture will be resumed.
For a slow motion picture in reverse playback, use the ◀| button.

To resume normal playback, press the PAUSE button again.

If a noise band appears during double speed or reverse playback, turn the TRACKING control until the noise band is removed
- Be sure to return the TRACKING control to the centre position after double speed or reverse viewing.



BACK AND FORTH PLAYBACK



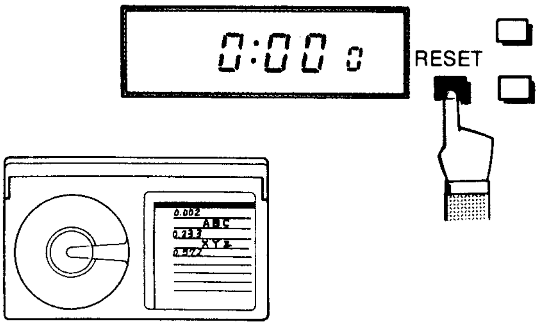
❶ During playback, press the PAUSE button.
❷ Press and release the ▶ and ◀ buttons alternately.
For slow back and forth playback, use the |▶ and ◀| buttons.

To resume normal playback, press the PAUSE button again.

1-10. TO LOCATE PARTICULAR SCENES QUICKLY

To reference a recorded programme numerically → TIME COUNTER

The time counter indicates how much the tape has advanced at normal playback speed in hours, minutes and tens of seconds. Before starting recording or playback, press the RESET button to set the counter to "0:00 0" and write the counter readings at the point you want to remember on the label of the cassette In this way you can easily find those points later.



- The counter reading is automatically reset to zero when the power is turned off.
- When the tape runs in reverse from "0:00 0", a minus sign "–" will be displayed to the left of the figures.

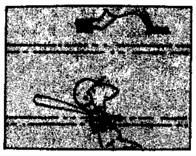
The time counter does not operate with brand-new tapes.
The time counter counts the CTL signals which are generated and recorded at the same time the video signals are recorded. Because brand-new tapes have no CTL signals recorded on them, the time counter cannot operate.

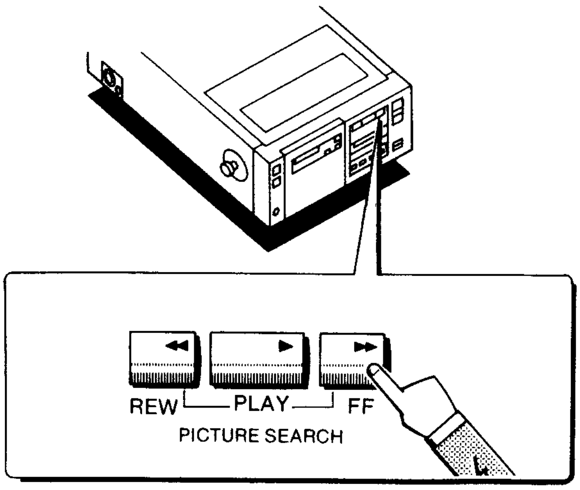
To visually search for a particular point → PICTURE SEARCH

Press the ▶▶ FF or ◀◀ REW button during playback
While the button is depressed, a high-speed playback picture in the forward or reverse direction can be seen.
Release the button for normal playback.

- Streaks will appear in the picture search mode.

If the picture rolls vertically during the picture search mode,adjust the vertical hold control on the TV.

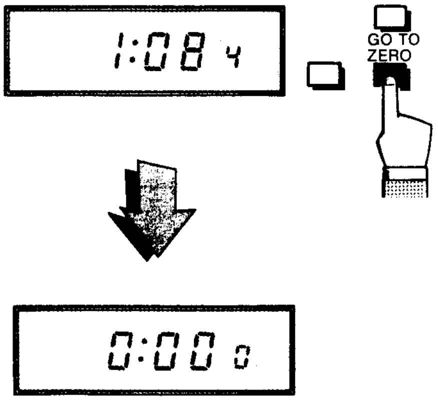




To return to a pre-registered point → GO TO ZERO

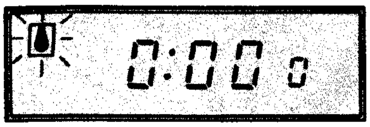
During recording or playback, press the RESET button at the point you later want to locate.
When the recording or playback is finished, stop the tape by pressing the ■ STOP button, then press the GO TO ZERO button. The tape will rewind or advance to the point where the RESET button was pressed

- The tape may stop a few seconds before or after 0:00 0.



1-11. IMPORTANT REWINDERS

If the 💧 indication blinks and the recorder does not operate
Moisture has condensed on the drum assembly inside the unit*. Remove the cassette and leave the recorder turned on until the indication goes off.



If the recorder is powered by a battery pack
It may take considerable time for moisture to evaporate as it must be done naturally, with the recorder's power off.

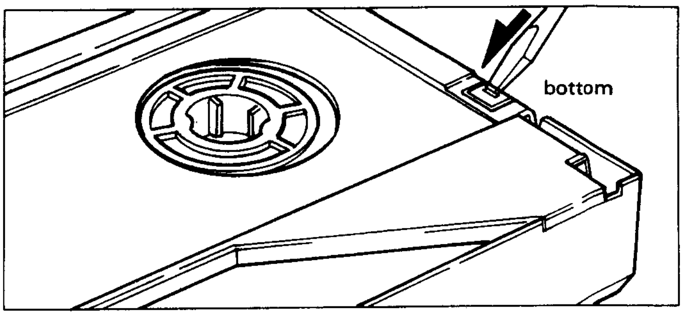
To cause moisture to evaporate more quickly
Connect a TT-F1E tuner timer unit or an AC-F1E ac power adaptor and leave the recorder turned on.
A heater built into the recorder will cause the moisture to evaporate within 1.5 hours.

*If the recorder is brought directly from a cold to a warm location, moisture may condense on the drum assembly inside the unit.
This may create a tendency for the tape to adhere to the head drum and both the tape and the recorder may be damaged.

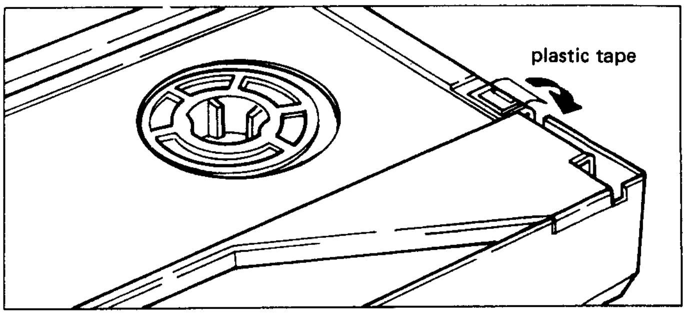
TO KEEP A RECORDED PROGRAMME FROM BEING ACCIDENTALLY ERASED

When a new recording is made on a previously recorded cassette, the previous recording will be automatically erased.

To avoid erasing a recording
Break off the safety tab on the bottom of the cassette using a screwdriver or similar object

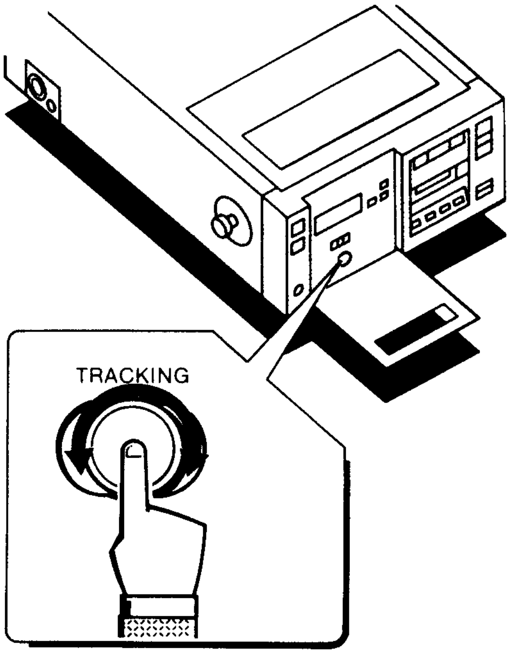


To re-record on a cassette which has had the safety tab removed, cover the slot with a piece of plastic tape



1-12. HOW IS THE PICTURE ON THE SCREEN

Streaks or snow appears
Has the tape been recorded on another video cassette recorder? If so, open the front compartment and adjust the TRACKING control for the best possible picture
Return the control to the center position after viewing a tape recorded on another machine.



Noisy picture
Video-head cleaning may be needed.
After the machine has been used for an extended period of time, the video heads may have become contaminated and require cleaning. Clean the video heads with the L-25CL video head cleaning cassette (optional). For details about cleaning, refer to the instructions furnished with the cleaning cassette.

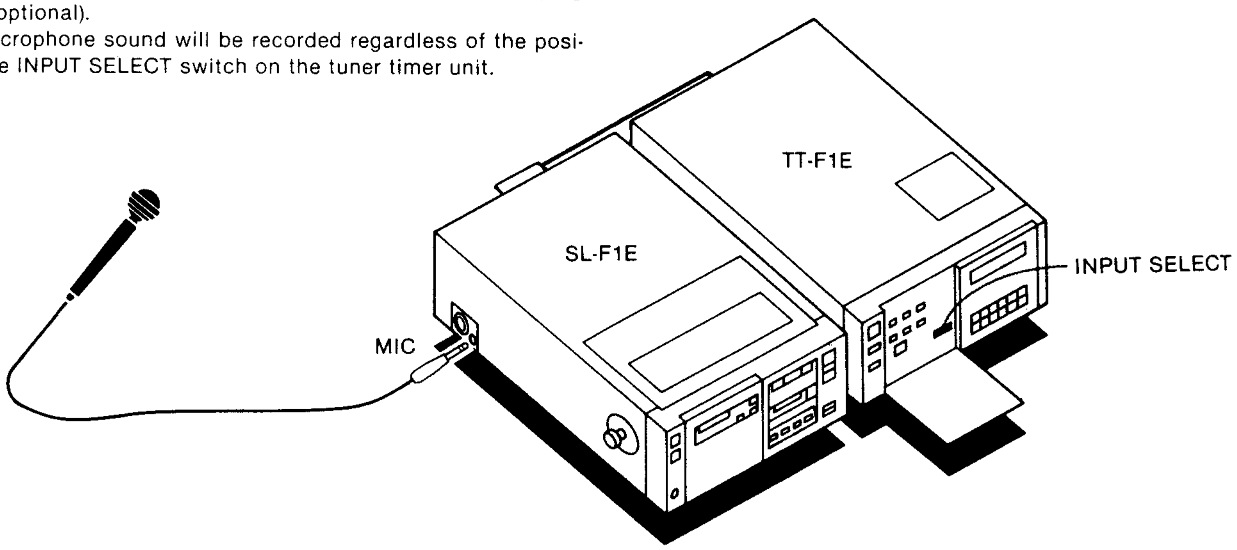
1-13. DUBBING AUDIO

You can record a music or commentary track on any recorded tape while watching the recorded picture.

CONNECTIONS

To record microphone sound
Connect a microphone to the MIC jack of the video cassette recorder. If your microphone has a phone plug, use the PC-1A plug adaptor (optional).

- The microphone sound will be recorded regardless of the position of the INPUT SELECT switch on the tuner timer unit.



To record from a monaural tape recorder or radio
If you want to connect an audio equipment directly to the recorder, use the VMC-330 video monitor cable (optional)

(For the connection using the tuner timer unit.)

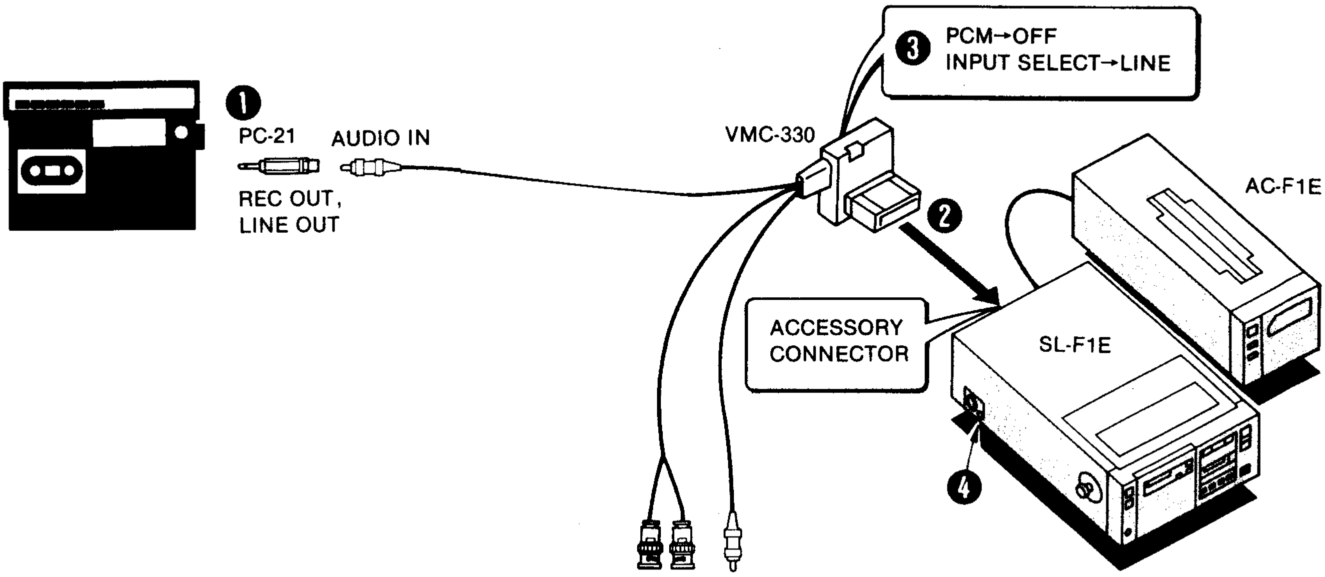
❶ Connect the AUDIO IN cable of the VMC-330 to the output of the audio equipment.

- If the output is a minijack, use a PC-21 plug adaptor.

❷ Connect the 26-pin connector to the ACCESSORY CONNECTOR of the recorder.

❸ Set the PCM switch on the VMC-330 to OFF and the INPUT SELECT switch to LINE.

❹ Make sure that a microphone is not connected to the recorder.


❶
PC-21
AUDIO IN
REC OUT,
LINE OUT
VMC-330
❸ PCM→OFF
INPUT SELECT→LINE
❷
AC-F1E
ACCESSORY
CONNECTOR
SL-F1E
❹

To use a tuner timer unit with the recorder, make connections with the RK-50A connecting cord (optional)

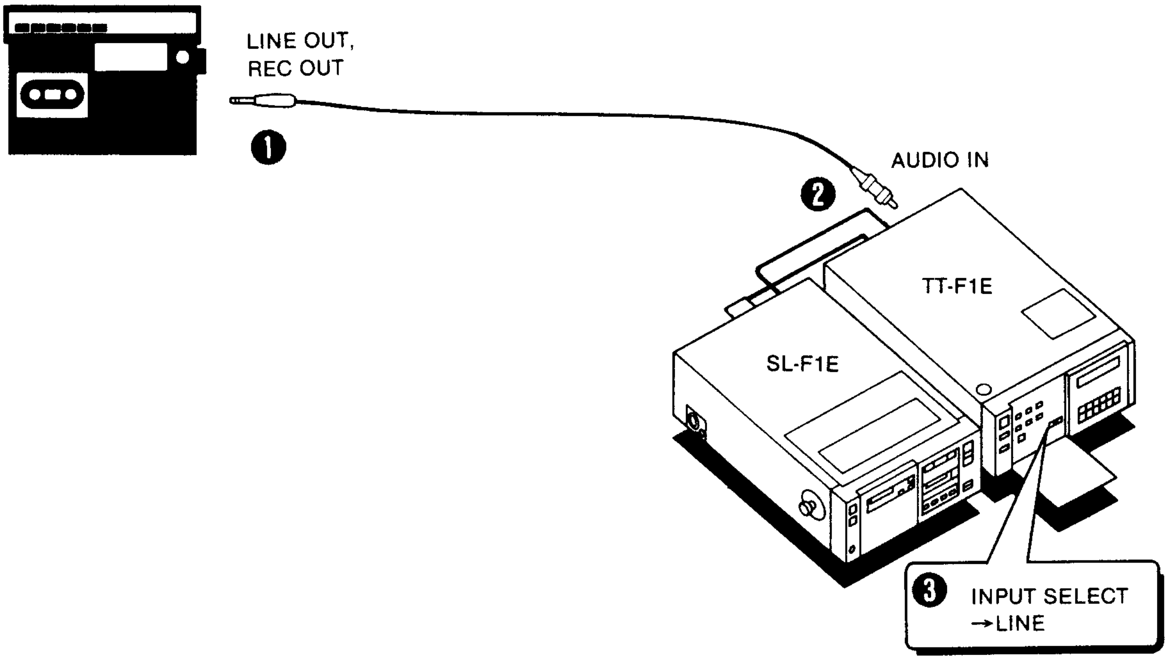
❶ Connect the RK-50A to the output of the audio unit.

- If the RK-50A's plug does not match the receptacle, use a commercially-available plug adaptor.

❷ Connect the RK-50A phono plug to the AUDIO IN jack of the tuner timer unit.

❸ Set the INPUT SELECT switch to LINE.

- The microphone should be disconnected from the recorder.


LINE OUT,
REC OUT
❶
AUDIO IN
❷
TT-F1E
SL-F1E
❸ INPUT SELECT
→LINE

First, decide at which point on the tape you will start audio dubbing and make the necessary preparations for playing the audio source.

❶ Turn on the recorder and insert a cassette.

● Be sure that the safety tab has not been removed.

❷ Press the ▶ PLAY button. Playback will begin.

❸ Press the PAUSE button at the point where audio dubbing is to start.

❹ Press the AUDIO DUB button.

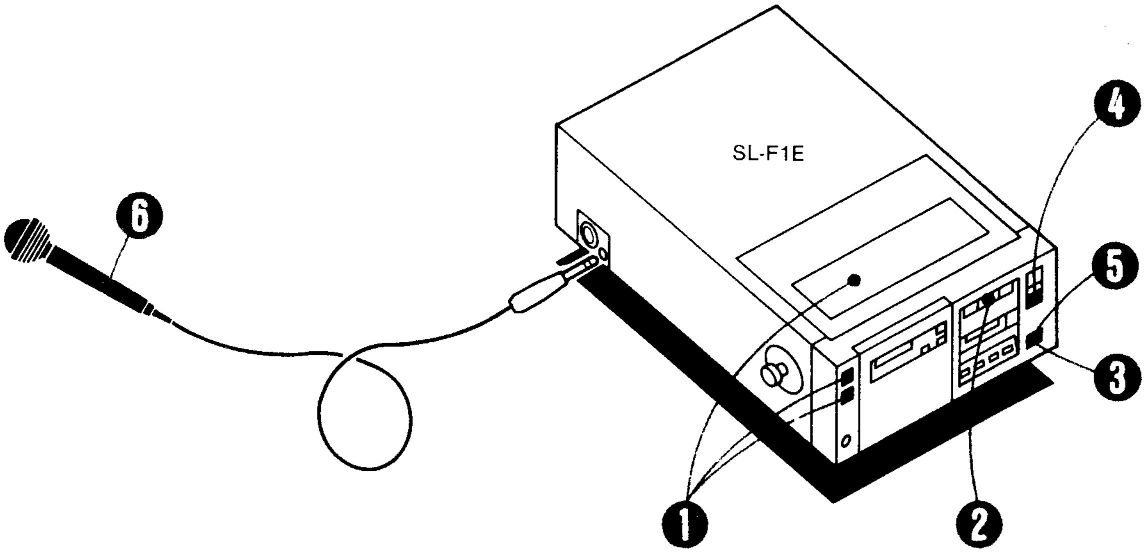
❺ Press the PAUSE button again to start audio dubbing.

❻ Start playing the audio source; talking into the microphone, playing the tape recorder, etc.

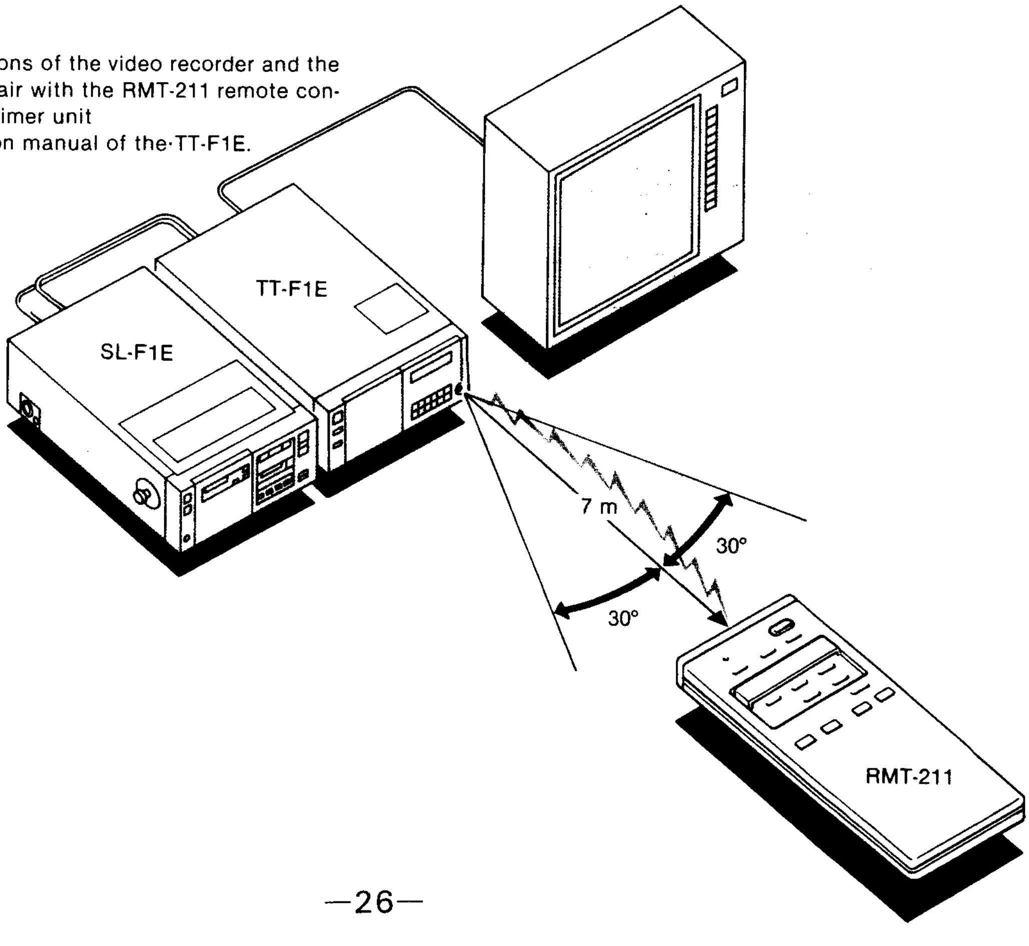
To stop dubbing,
Press the ■ STOP button.
To stop the tape momentarily during dubbing, use the PAUSE button.

To record from the beginning of the tape
While pressing the AUDIO DUB button, press the ▶ PLAY button. Audio recording and picture playback will start immediately.

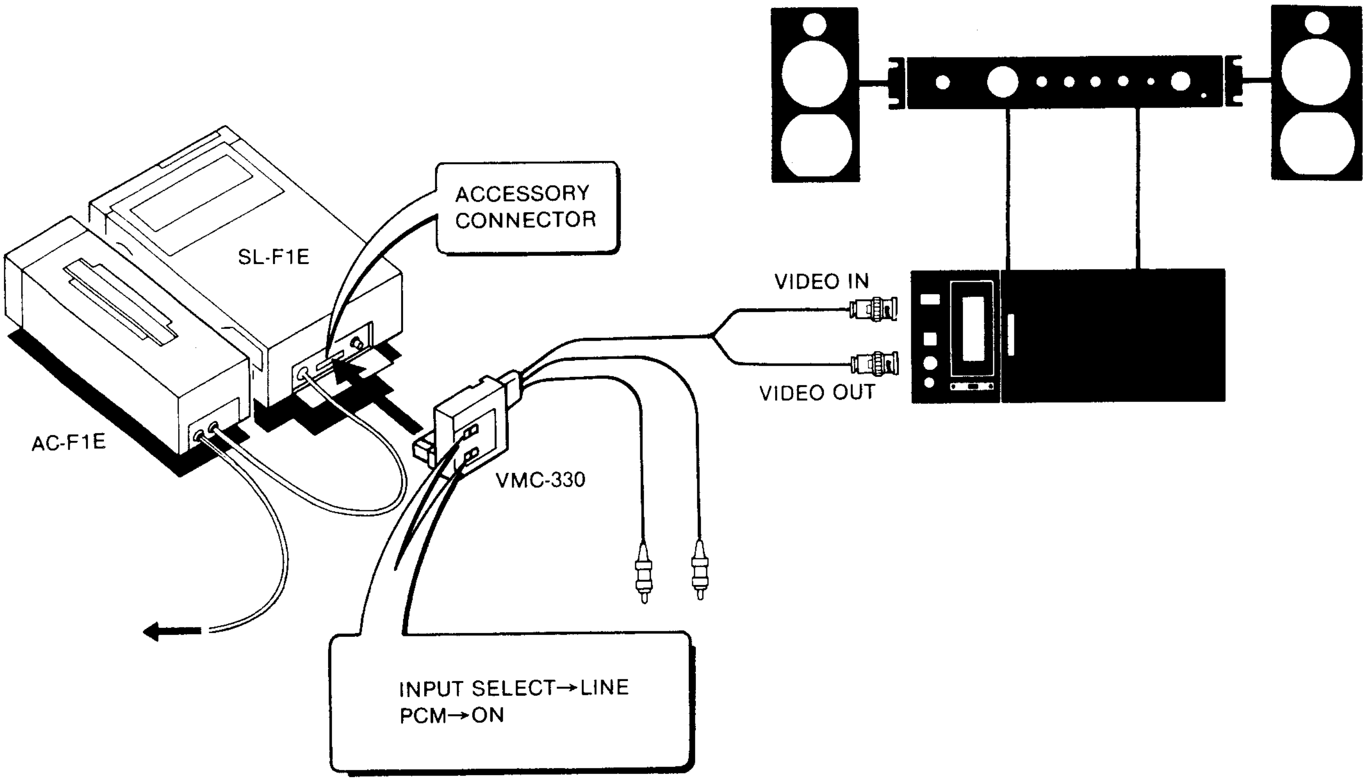
If a whistle-like sound is heard during microphone recording
Point the microphone away from the TV or turn the TV volume down.



You can control almost all functions of the video recorder and the tuner timer unit from your armchair with the RMT-211 remote control unit supplied with the tuner timer unit
For details, refer to the instruction manual of the TT-F1E.



By connecting a PCM digital audio processor, such as a Sony PCM-10, you can enjoy hi-fi sound reproduction with a wide dynamic range, minimal distortion and a flat frequency response.
To connect the PCM audio processor directly to the recorder
When a tuner timer unit is used, connect the processor to the VIDEO IN and OUT jacks using BNC-to-phono plug cords.
In any case, be sure to set the PCM switch to ON position and the INPUT SELECT switch to LINE.
For details on operation of this system, see the instruction manual of the PCM processor.


ACCESSORY CONNECTOR
SL-F1E
AC-F1E
VMC-330
VIDEO IN
VIDEO OUT
INPUT SELECT→LINE
PCM→ON

1-14. DISASSEMBLY

Note:

- Follow the disassembly procedure in the numerical order given.
- All screws are Phillips (cross recess) type.

1. CASSETTE COMPARTMENT COVER, UPPER PANEL, BOTTOM PANEL

Unscrew the screws shown in Fig. 1, and remove the upper and bottom panels.

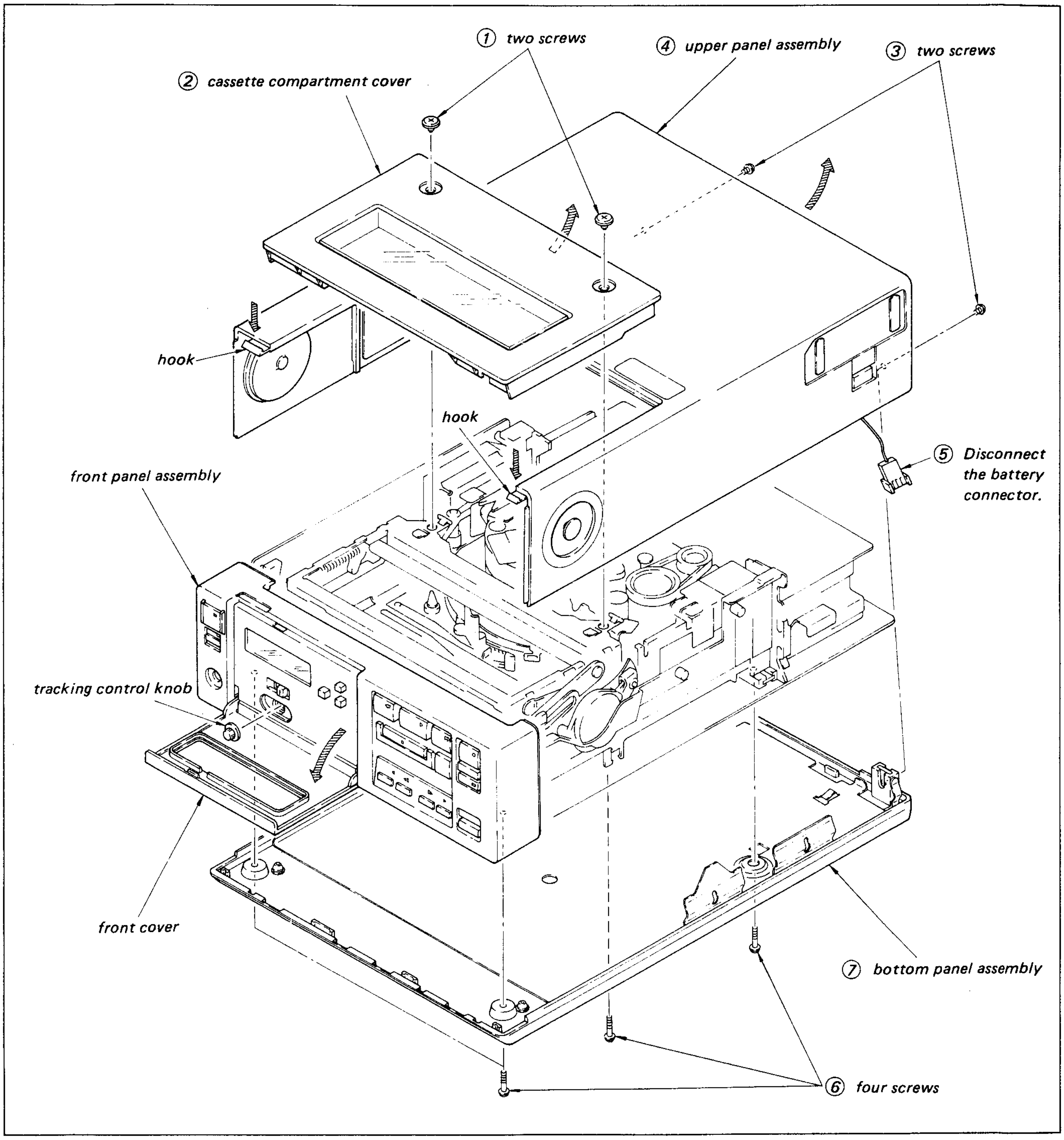

① two screws
④ upper panel assembly
③ two screws
② cassette compartment cover
hook
hook
front panel assembly
⑤ Disconnect the battery connector.
tracking control knob
front cover
⑦ bottom panel assembly
⑥ four screws

Fig. 1. Panel assembly removal

2. FRONT PANEL

Extract the tracking knob, disengage the right and left hooks (A), and, while holding hooks (B) down with a screwdriver inserted between the circuit board and the front panel, remove the front panel. (Refer to Fig. 2)

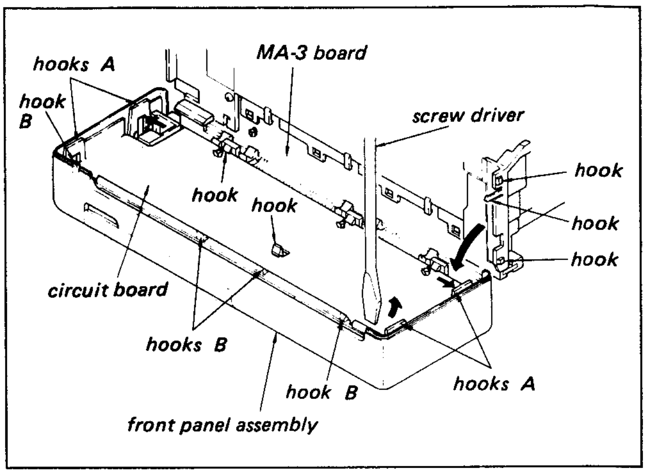

hooks A
MA-3 board
hook B
screw driver
hook
hook
hook
hook
hook
hook
circuit board
hooks B
hook B
hooks A
front panel assembly

Fig. 2. Front panel removal

3. MECHANISM CASSIS

With this set, the mechanism can be completely disengaged from the circuit board.

1) Unscrew the screws from the rear side of the MA-3 circuit board.
2) Disconnect the connectors. This must be done in order to remove the reel motor, capstan, and the durm.

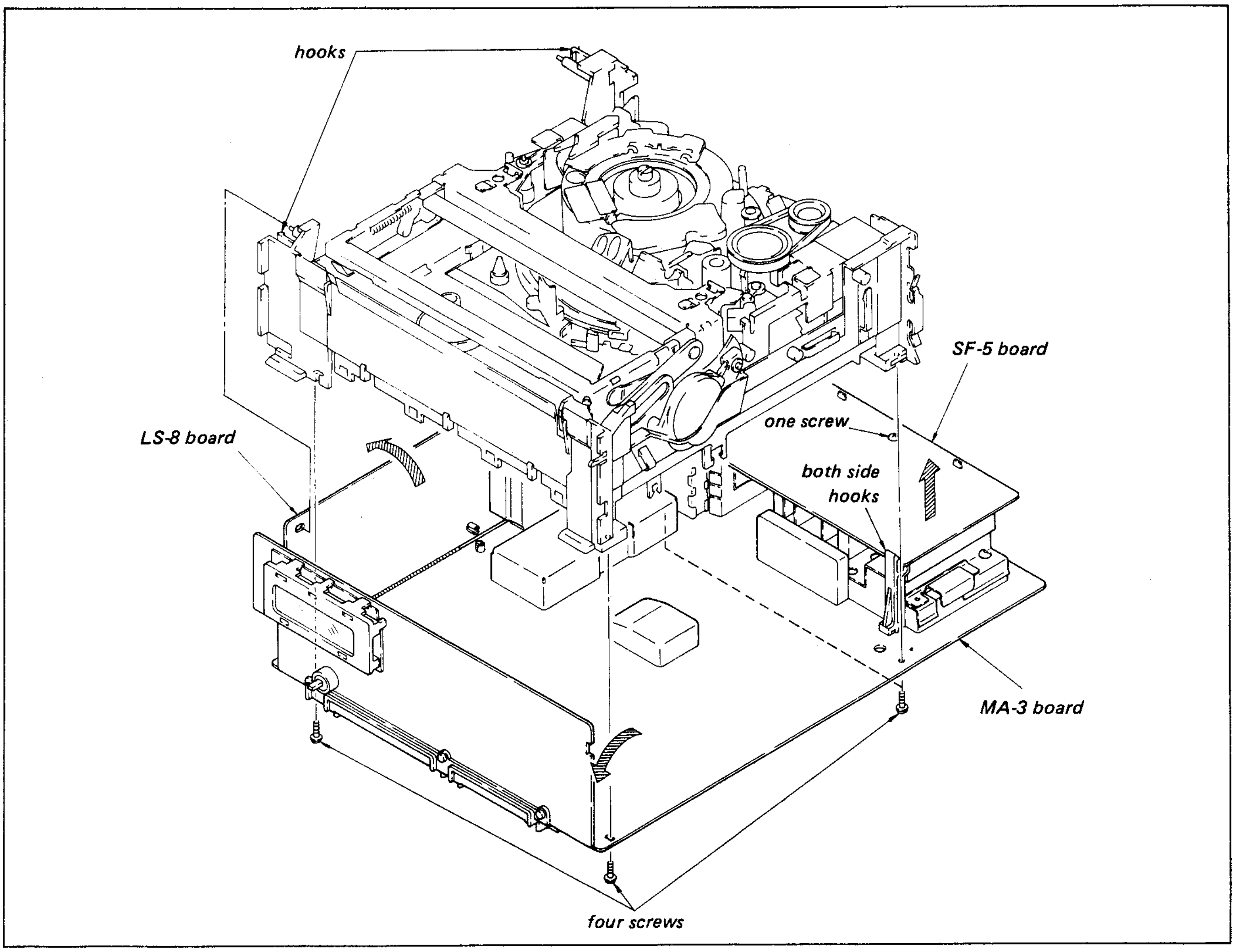
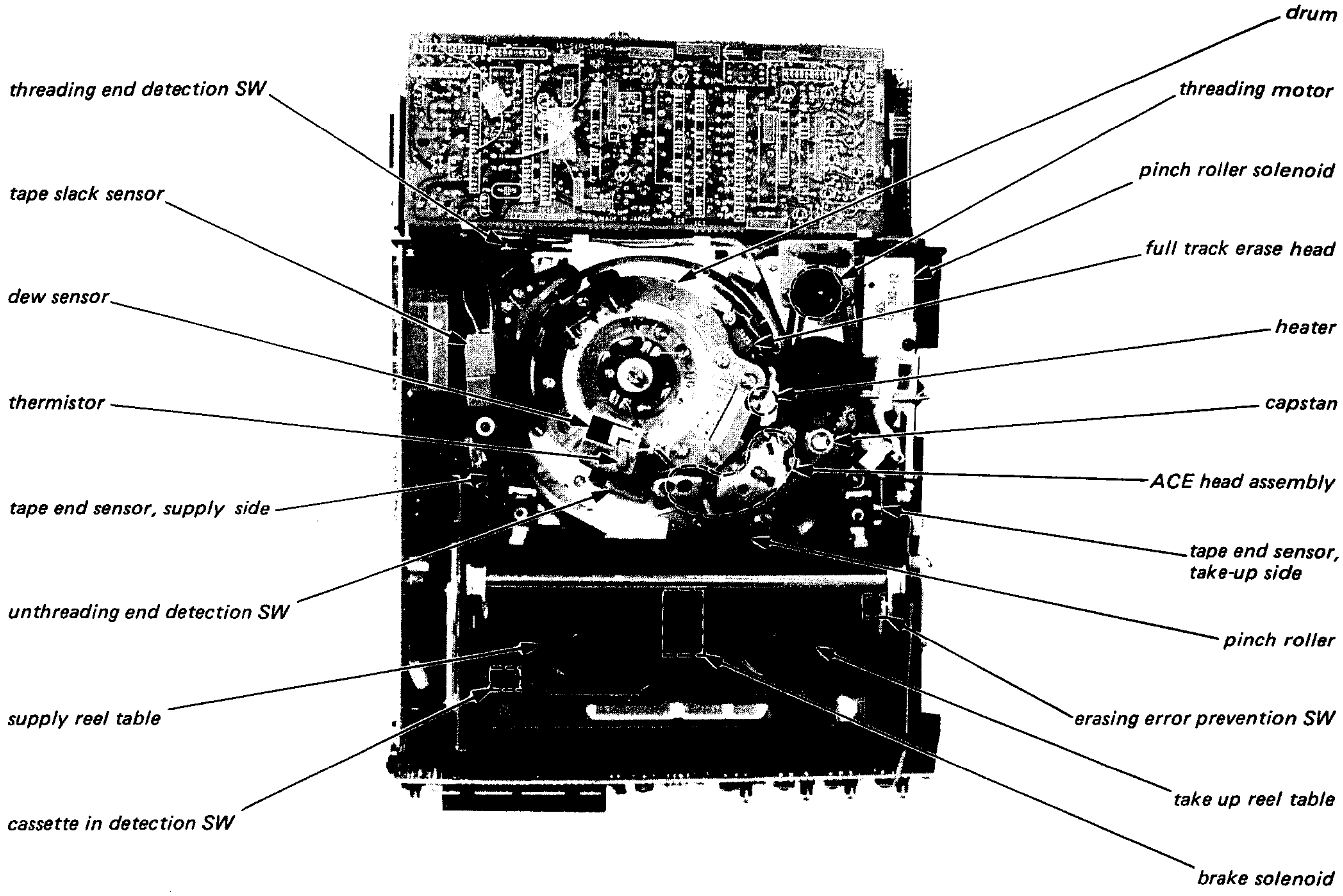
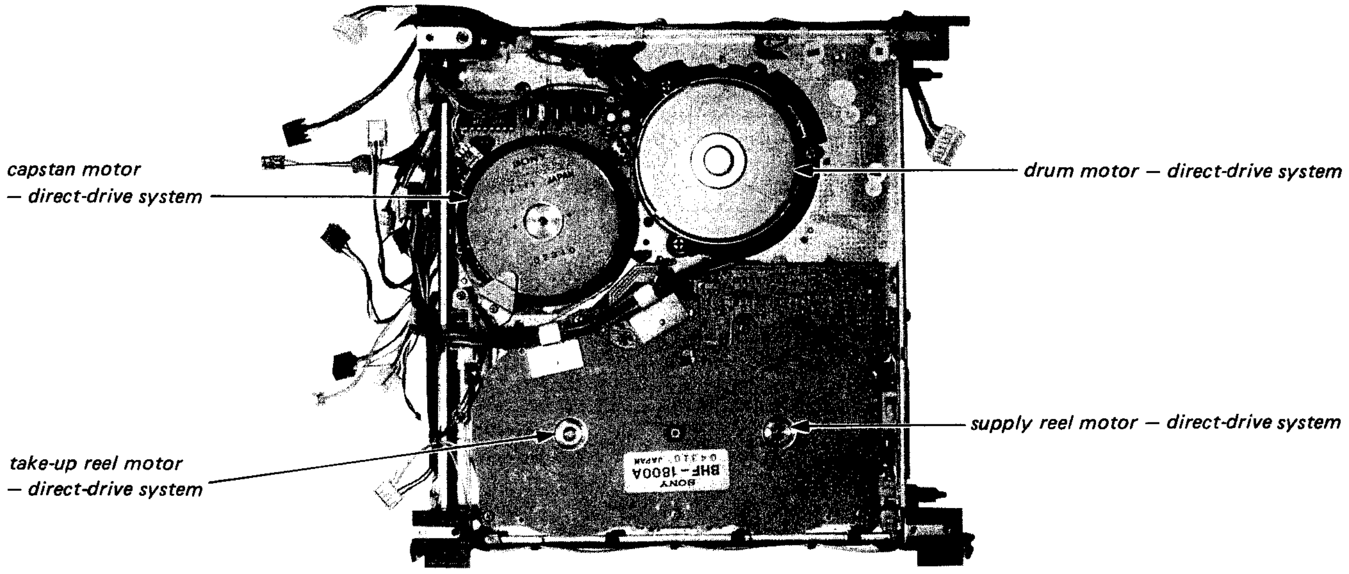

hooks
SF-5 board
one screw
LS-8 board
both side hooks
MA-3 board
four screws

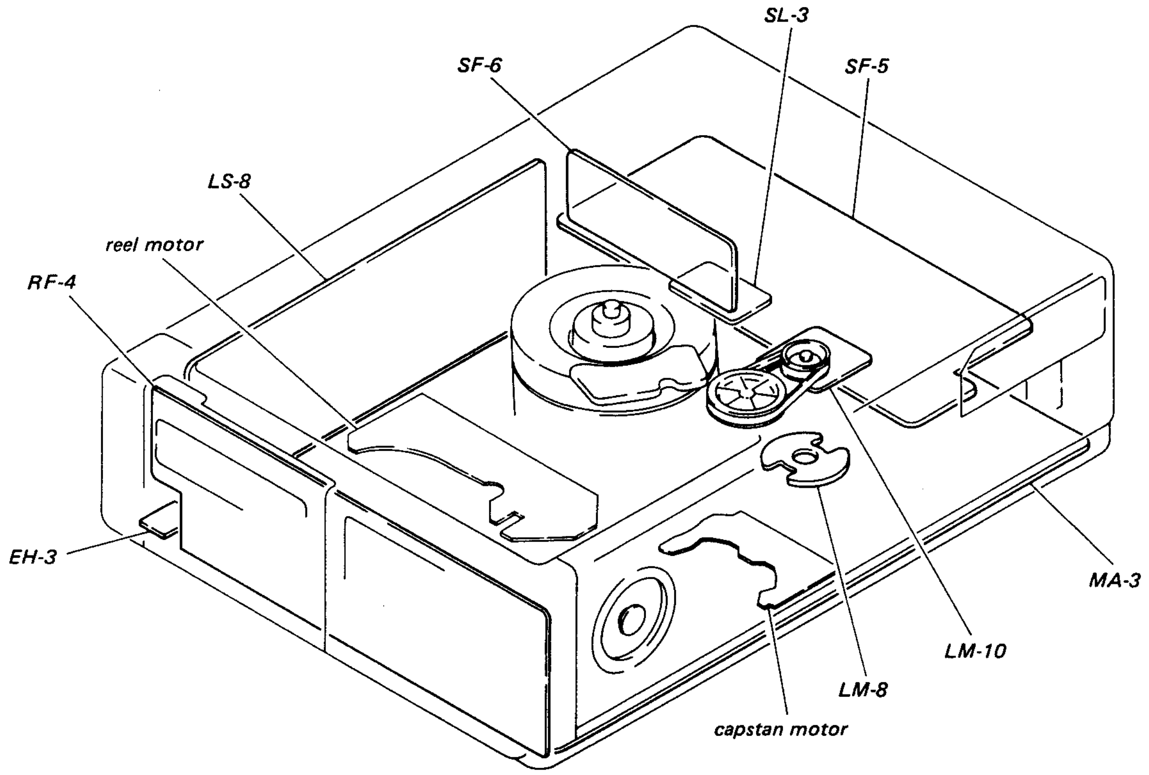
Fig. 3. Mechanism block removal

1-15. INTERNAL VIEWS


drum
threading end detection SW
threading motor
tape slack sensor
pinch roller solenoid
full track erase head
dew sensor
heater
thermistor
capstan
ACE head assembly
tape end sensor, supply side
tape end sensor, take-up side
unthreading end detection SW
pinch roller
supply reel table
erasing error prevention SW
take up reel table
cassette in detection SW
brake solenoid

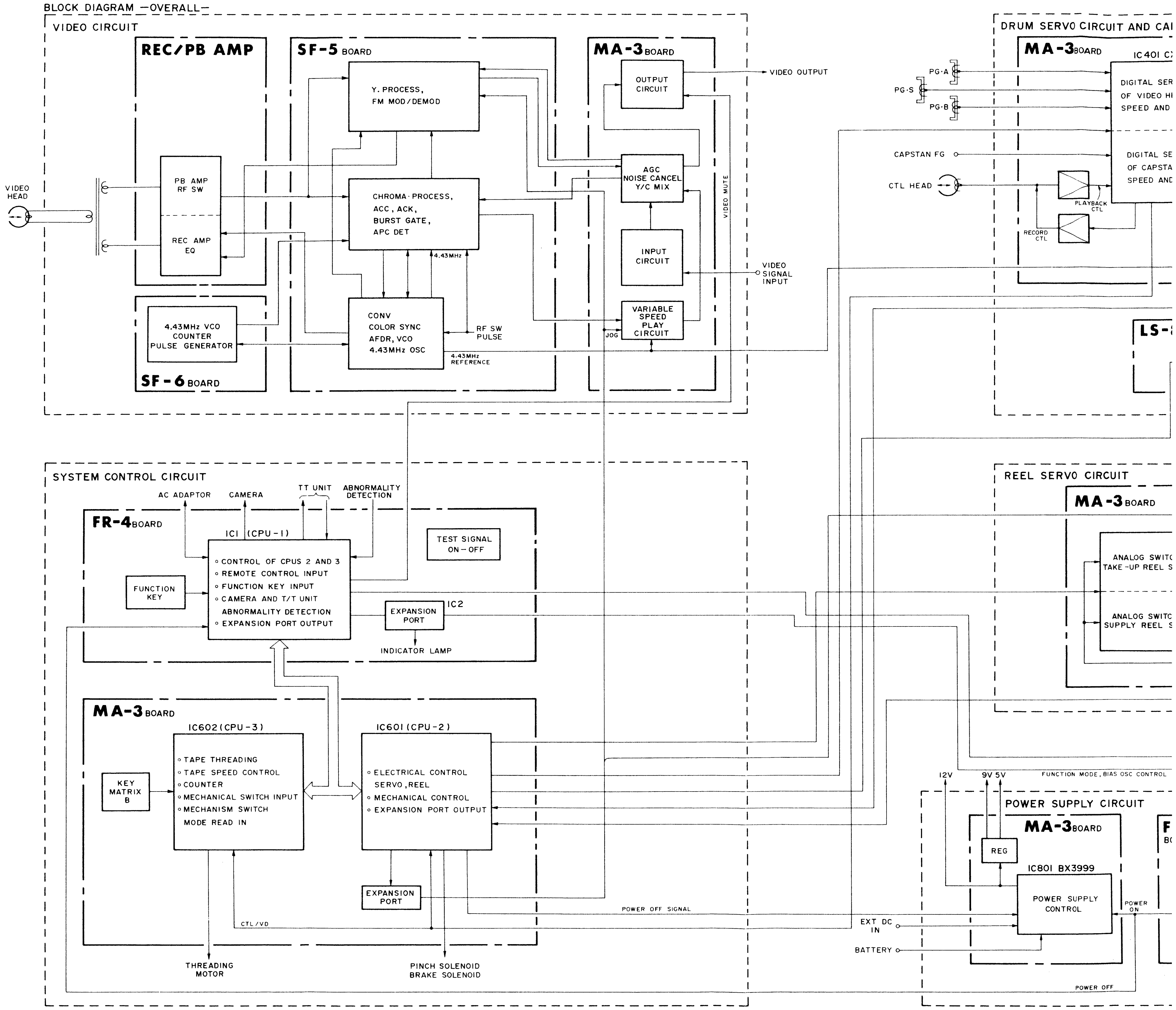

capstan motor — direct-drive system
drum motor — direct-drive system
supply reel motor — direct-drive system
take-up reel motor — direct-drive system
SONY
BHF-1800A
JAPAN

CIRCUIT BOARDS LOCATION

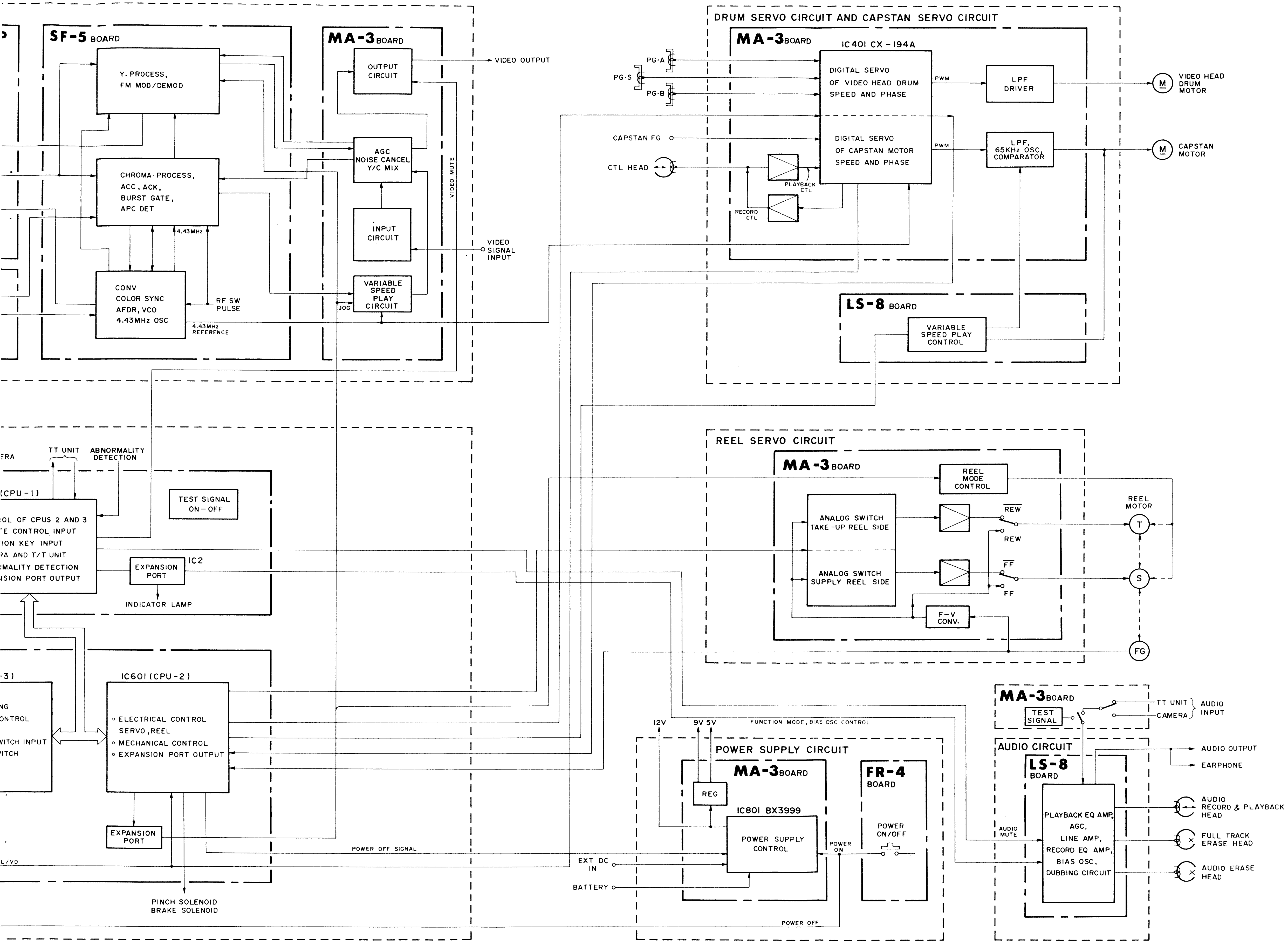

SL-3
SF-6
SF-5
LS-8
reel motor
RF-4
EH-3
MA-3
LM-10
LM-8
capstan motor

SECTION 2
BLOCK DIAGRAM

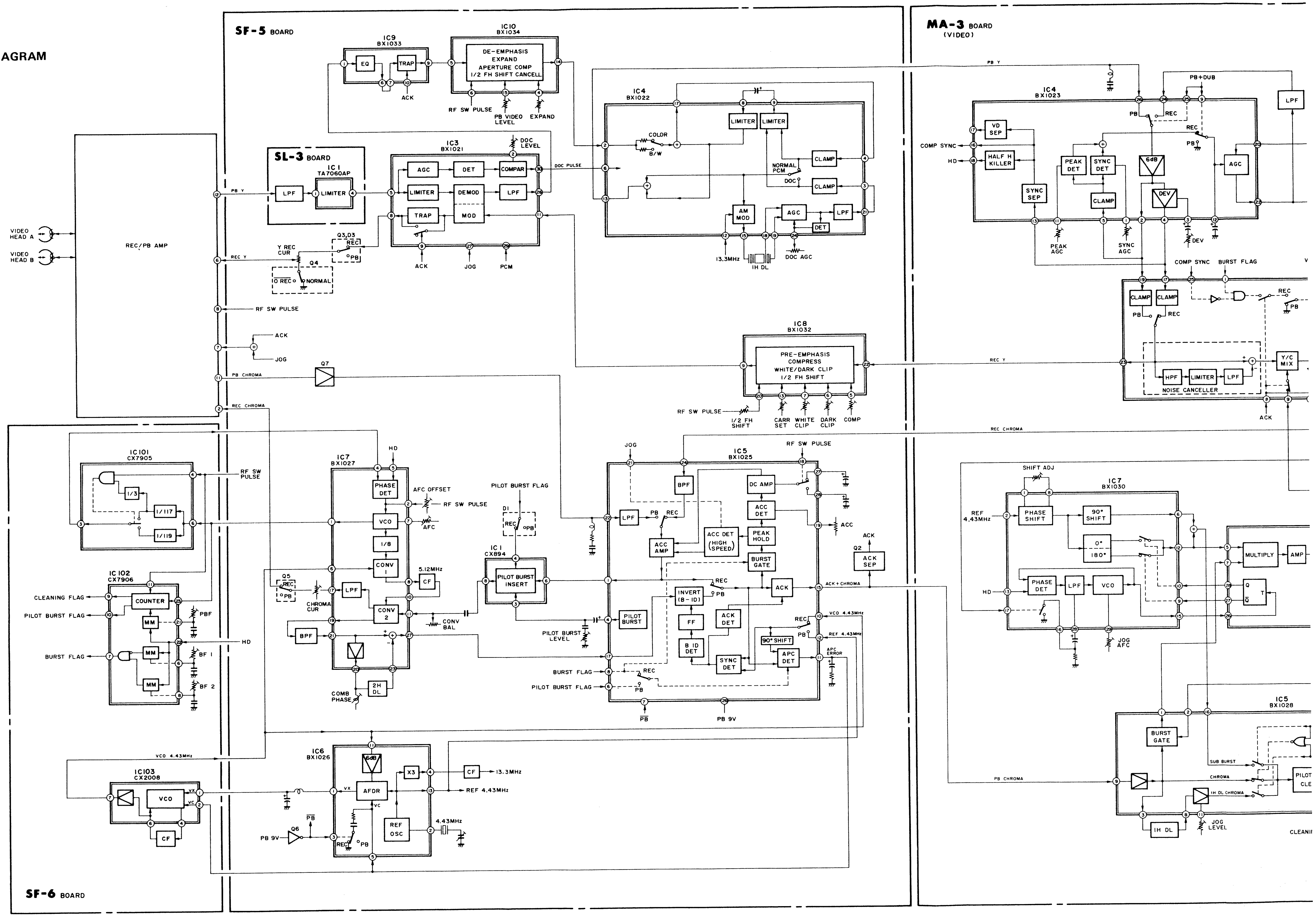
OVERALL BLOCK DIAGRAM



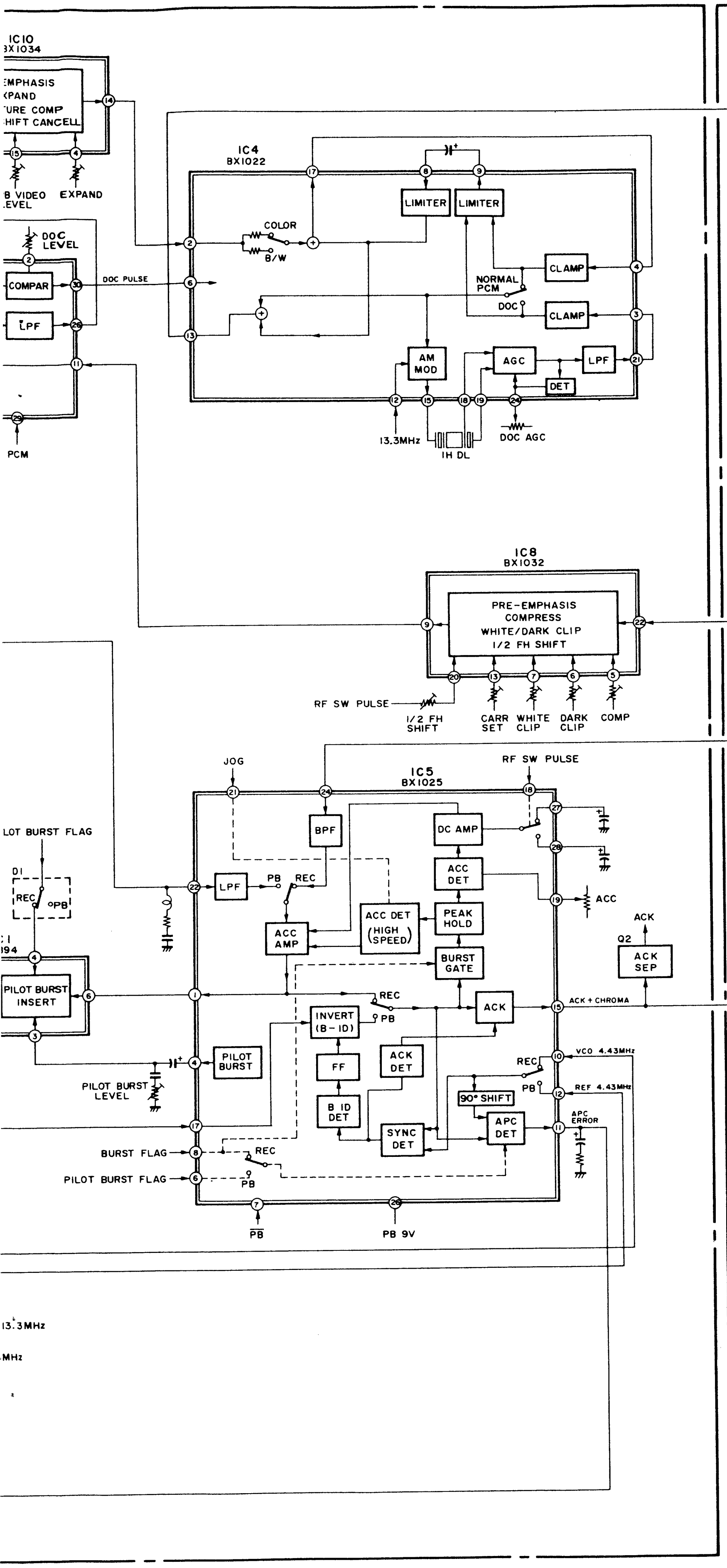
BLOCK DIAGRAM —OVERALL—
VIDEO CIRCUIT
REC/PB AMP
VIDEO HEAD
PB AMP
RF SW
REC AMP
EQ
4.43MHz VCO
COUNTER
PULSE GENERATOR
SF-6 BOARD
SF-5 BOARD
Y. PROCESS,
FM MOD/DEMOD
CHROMA·PROCESS,
ACC, ACK,
BURST GATE,
APC DET
4.43MHz
CONV
COLOR SYNC
AFDR, VCO
4.43MHz OSC
RF SW
PULSE
4.43MHz
REFERENCE
MA-3 BOARD
OUTPUT
CIRCUIT
VIDEO OUTPUT
AGC
NOISE CANCEL
Y/C MIX
INPUT
CIRCUIT
VIDEO
SIGNAL
INPUT
VARIABLE
SPEED
PLAY
CIRCUIT
JOG
VIDEO MUTE
DRUM SERVO CIRCUIT AND CA
MA-3 BOARD
IC401 C
PG·A
PG·S
PG·B
DIGITAL SER
OF VIDEO H
SPEED AND
CAPSTAN FG
DIGITAL SE
OF CAPSTA
SPEED AND
CTL HEAD
PLAYBACK
CTL
RECORD
CTL
LS-
SYSTEM CONTROL CIRCUIT
AC ADAPTOR
CAMERA
TT UNIT
ABNORMALITY
DETECTION
FR-4 BOARD
IC1 (CPU-1)
○ CONTROL OF CPUS 2 AND 3
○ REMOTE CONTROL INPUT
○ FUNCTION KEY INPUT
○ CAMERA AND T/T UNIT
ABNORMALITY DETECTION
○ EXPANSION PORT OUTPUT
FUNCTION
KEY
TEST SIGNAL
ON-OFF
EXPANSION
PORT
IC2
INDICATOR LAMP
MA-3 BOARD
IC602 (CPU-3)
○ TAPE THREADING
○ TAPE SPEED CONTROL
○ COUNTER
○ MECHANICAL SWITCH INPUT
○ MECHANISM SWITCH
MODE READ IN
KEY
MATRIX
B
IC601 (CPU-2)
○ ELECTRICAL CONTROL
SERVO, REEL
○ MECHANICAL CONTROL
○ EXPANSION PORT OUTPUT
EXPANSION
PORT
CTL/VD
POWER OFF SIGNAL
THREADING
MOTOR
PINCH SOLENOID
BRAKE SOLENOID
REEL SERVO CIRCUIT
MA-3 BOARD
ANALOG SWIT
TAKE-UP REEL S
ANALOG SWIT
SUPPLY REEL S
FUNCTION MODE, BIAS OSC CONTROL
12V
9V 5V
POWER SUPPLY CIRCUIT
MA-3 BOARD
REG
IC801 BX3999
POWER SUPPLY
CONTROL
POWER
ON
EXT DC
IN
BATTERY
POWER OFF
F
B

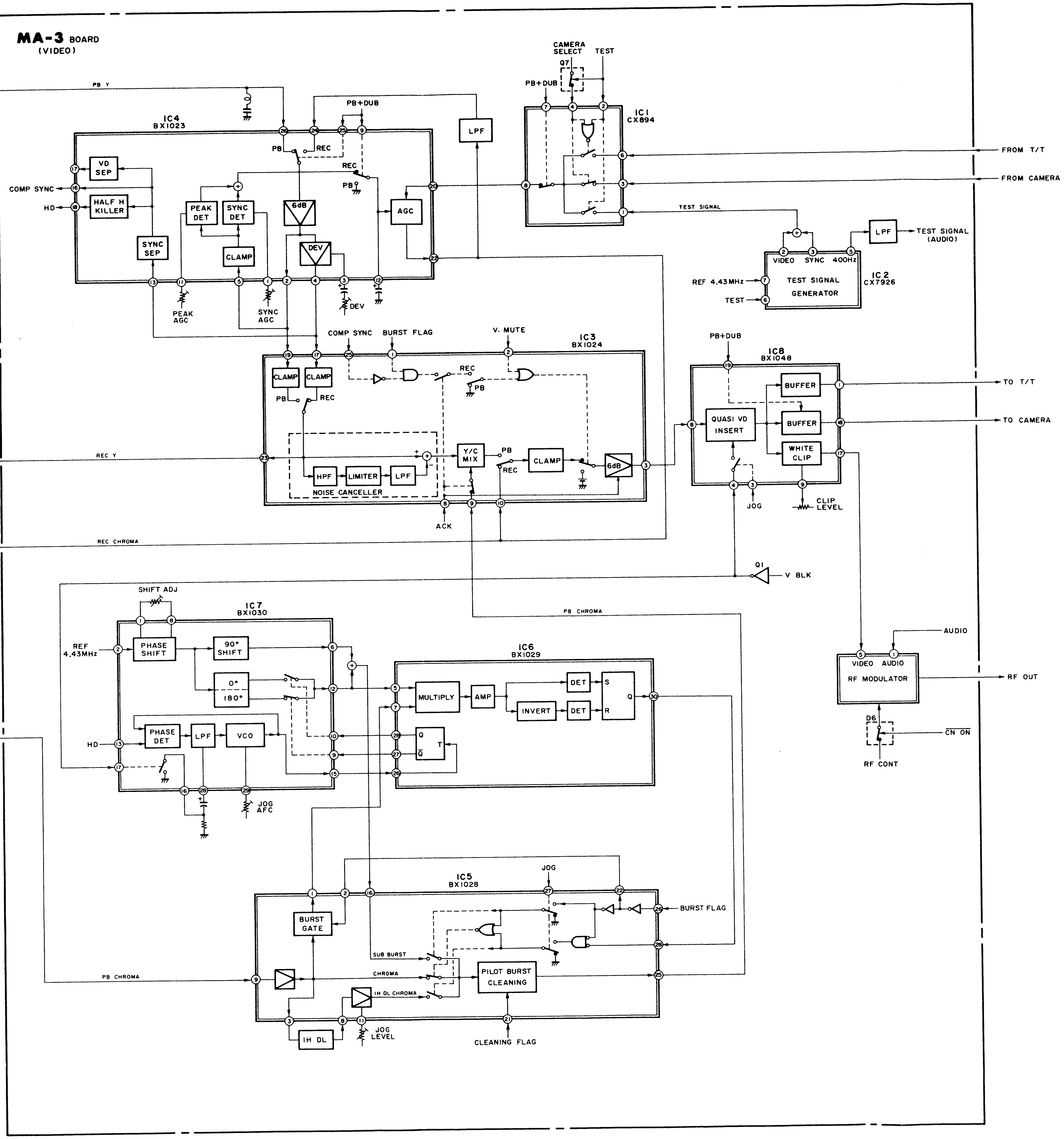

SF-5 BOARD
Y. PROCESS, FM MOD/DEMOD
CHROMA PROCESS, ACC, ACK, BURST GATE, APC DET
4.43MHz
CONV COLOR SYNC AFDR, VCO 4.43MHz OSC
RF SW PULSE
4.43MHz REFERENCE
MA-3 BOARD
OUTPUT CIRCUIT
VIDEO OUTPUT
AGC NOISE CANCEL Y/C MIX
VIDEO MUTE
INPUT CIRCUIT
VIDEO SIGNAL INPUT
VARIABLE SPEED PLAY CIRCUIT
JOG
ERA
TT UNIT
ABNORMALITY DETECTION
(CPU-1)
TEST SIGNAL ON-OFF
OL OF CPUS 2 AND 3
TE CONTROL INPUT
ION KEY INPUT
RA AND T/T UNIT
RMALITY DETECTION
SION PORT OUTPUT
EXPANSION PORT
IC2
INDICATOR LAMP
-3)
NG
ONTROL
ITCH INPUT
ITCH
IC601 (CPU-2)
ELECTRICAL CONTROL SERVO, REEL
MECHANICAL CONTROL
EXPANSION PORT OUTPUT
EXPANSION PORT
L/VD
POWER OFF SIGNAL
PINCH SOLENOID
BRAKE SOLENOID
DRUM SERVO CIRCUIT AND CAPSTAN SERVO CIRCUIT
MA-3 BOARD
IC401 CX-194A
PG-A
PG-S
PG-B
DIGITAL SERVO OF VIDEO HEAD DRUM SPEED AND PHASE
PWM
LPF DRIVER
M
VIDEO HEAD DRUM MOTOR
CAPSTAN FG
DIGITAL SERVO OF CAPSTAN MOTOR SPEED AND PHASE
PWM
LPF, 65KHz OSC, COMPARATOR
CAPSTAN MOTOR
CTL HEAD
PLAYBACK CTL
RECORD CTL
LS-8 BOARD
VARIABLE SPEED PLAY CONTROL
REEL SERVO CIRCUIT
MA-3 BOARD
REEL MODE CONTROL
ANALOG SWITCH TAKE-UP REEL SIDE
ANALOG SWITCH SUPPLY REEL SIDE
REW
REW
FF
FF
F-V CONV.
REEL MOTOR
T
S
FG
MA-3 BOARD
TEST SIGNAL
TT UNIT
CAMERA
AUDIO INPUT
AUDIO CIRCUIT
LS-8 BOARD
AUDIO MUTE
PLAYBACK EQ AMP, AGC, LINE AMP, RECORD EQ AMP, BIAS OSC, DUBBING CIRCUIT
AUDIO OUTPUT
EARPHONE
AUDIO RECORD & PLAYBACK HEAD
FULL TRACK ERASE HEAD
AUDIO ERASE HEAD
12V
9V 5V
FUNCTION MODE, BIAS OSC CONTROL
POWER SUPPLY CIRCUIT
MA-3 BOARD
REG
IC801 BX3999
POWER SUPPLY CONTROL
EXT DC IN
BATTERY
POWER ON
FR-4 BOARD
POWER ON/OFF
POWER OFF

VIDEO SYSTEM BLOCK DIAGRAM



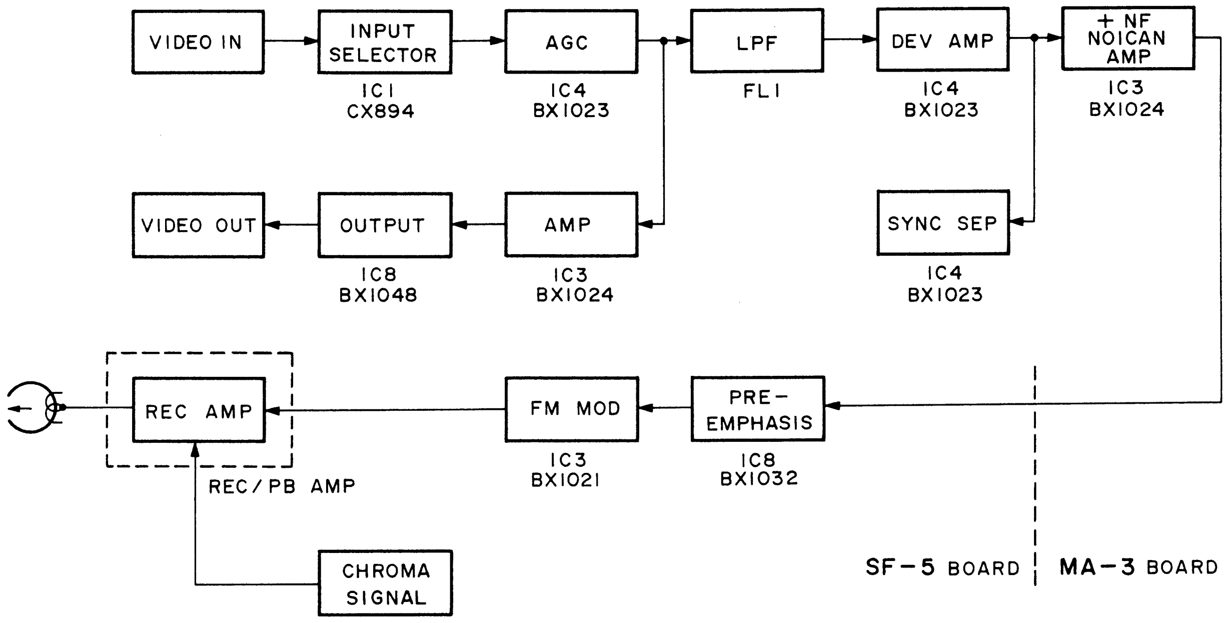
SF-5 BOARD
SL-3 BOARD
SF-6 BOARD
MA-3 BOARD (VIDEO)
VIDEO HEAD A
VIDEO HEAD B
REC/PB AMP
PB Y
REC Y
RF SW PULSE
ACK
JOG
PB CHROMA
REC CHROMA
IC9 BX1033
EQ
TRAP
IC10 BX1034
DE-EMPHASIS
EXPAND
APERTURE COMP
1/2 FH SHIFT CANCELL
RF SW PULSE
PB VIDEO LEVEL
EXPAND
IC1 TA7060AP
LPF
LIMITER
IC3 BX1021
DOC LEVEL
AGC
DET
COMPAR
DOC PULSE
LIMITER
DEMOD
LPF
TRAP
MOD
PCM
Y REC CUR
Q3, D3
REC
PB
Q4
REC
NORMAL
IC4 BX1022
COLOR
B/W
LIMITER
LIMITER
CLAMP
NORMAL PCM
DOC
CLAMP
AM MOD
AGC
LPF
DET
13.3MHz
1H DL
DOC AGC
IC8 BX1032
PRE-EMPHASIS
COMPRESS
WHITE/DARK CLIP
1/2 FH SHIFT
RF SW PULSE
1/2 FH SHIFT
CARR SET
WHITE CLIP
DARK CLIP
COMP
REC Y
Q7
IC101 CX7905
RF SW PULSE
1/3
1/117
1/119
IC102 CX7906
CLEANING FLAG
PILOT BURST FLAG
BURST FLAG
COUNTER
MM
MM
MM
PBF
BF 1
BF 2
HD
IC7 BX1027
PHASE DET
AFC OFFSET
RF SW PULSE
VCO
AFC
1/8
CONV 1
5.12MHz
CF
Q5
CHROMA CUR
LPF
CONV 2
CONV BAL
BPF
2H DL
COMB PHASE
PILOT BURST FLAG
D1
IC1 CX894
PILOT BURST INSERT
PILOT BURST LEVEL
BURST FLAG
PILOT BURST FLAG
IC5 BX1025
JOG
RF SW PULSE
BPF
DC AMP
ACC DET
ACC
LPF
ACC AMP
ACC DET (HIGH SPEED)
PEAK HOLD
BURST GATE
ACK
ACK + CHROMA
INVERT (B-ID)
FF
B ID DET
ACK DET
SYNC DET
90° SHIFT
APC DET
PILOT BURST
VCO 4.43MHz
REF 4.43MHz
APC ERROR
PB
PB 9V
Q2
ACK SEP
IC6 BX1026
6dB
X3
CF
13.3MHz
AFDR
REF 4.43MHz
REF OSC
4.43MHz
PB 9V
Q6
IC103 CX2008
VCO
CF
VCO 4.43MHz
IC4 BX1023
PB+DUB
LPF
COMP SYNC
HD
VD SEP
HALF H KILLER
SYNC SEP
PEAK DET
SYNC DET
CLAMP
6dB
DEV
AGC
PEAK AGC
SYNC AGC
DEV
COMP SYNC
BURST FLAG
CLAMP
CLAMP
HPF
LIMITER
LPF
NOISE CANCELLER
Y/C MIX
ACK
REC CHROMA
IC7 BX1030
SHIFT ADJ
REF 4.43MHz
PHASE SHIFT
90° SHIFT
0°
180°
PHASE DET
LPF
VCO
JOG AFC
MULTIPLY
AMP
IC5 BX1028
BURST GATE
SUB BURST
CHROMA
1H DL CHROMA
1H DL
JOG LEVEL
PB CHROMA


IC10
3X1034
EMPHASIS
XPAND
TURE COMP
HIFT CANCELL
B VIDEO
LEVEL
EXPAND
DOC
LEVEL
COMPAR
LPF
DOC PULSE
PCM
IC4
BX1022
COLOR
B/W
LIMITER
LIMITER
CLAMP
NORMAL
PCM
DOC
CLAMP
AM
MOD
AGC
LPF
DET
13.3MHz
1H DL
DOC AGC
IC8
BX1032
PRE-EMPHASIS
COMPRESS
WHITE/DARK CLIP
1/2 FH SHIFT
REC Y
RF SW PULSE
1/2 FH
SHIFT
CARR
SET
WHITE
CLIP
DARK
CLIP
COMP
REC CHROMA
JOG
IC5
BX1025
RF SW PULSE
LOT BURST FLAG
D1
REC
PB
BPF
DC AMP
ACC
DET
PEAK
HOLD
BURST
GATE
ACC DET
(HIGH
SPEED)
ACC
AMP
LPF
PB
REC
ACC
ACK
Q2
ACK
SEP
ACK + CHROMA
PILOT BURST
INSERT
194
INVERT
(B - ID)
FF
B ID
DET
ACK
DET
SYNC
DET
90° SHIFT
APC
DET
VCO 4.43MHz
REF 4.43MHz
APC
ERROR
PILOT
BURST
PILOT BURST
LEVEL
BURST FLAG
PILOT BURST FLAG
REC
PB
PB
PB 9V
13.3MHz
MHz

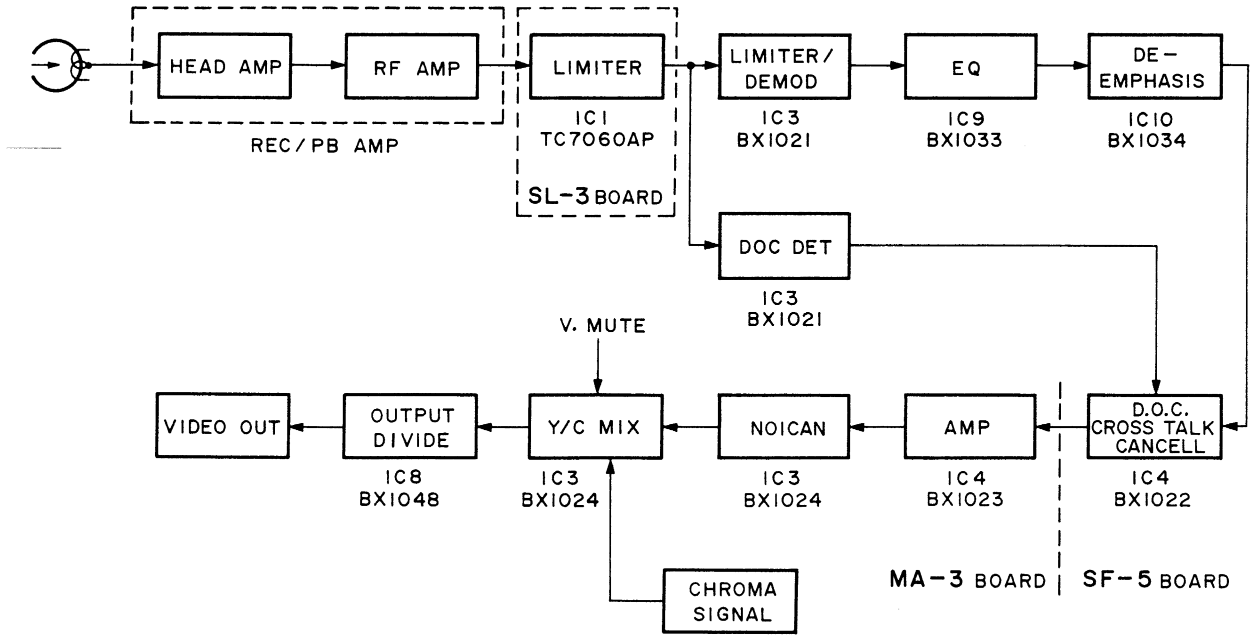

MA-3 BOARD
(VIDEO)
PB Y
IC4
BX1023
PB+DUB
LPF
PB
REC
REC
PB
VD
SEP
COMP SYNC
HD
HALF H
KILLER
PEAK
DET
SYNC
DET
6dB
AGC
SYNC
SEP
CLAMP
DEV
PEAK
AGC
SYNC
AGC
DEV
CAMERA
SELECT
TEST
Q7
PB+DUB
IC1
CX894
FROM T/T
FROM CAMERA
TEST SIGNAL
LPF
TEST SIGNAL
(AUDIO)
VIDEO
SYNC
400Hz
REF 4.43MHz
TEST SIGNAL
GENERATOR
TEST
IC2
CX7926
COMP SYNC
BURST FLAG
V. MUTE
IC3
BX1024
CLAMP
CLAMP
PB
REC
REC
PB
REC Y
HPF
LIMITER
LPF
NOISE CANCELLER
Y/C
MIX
PB
REC
CLAMP
6dB
ACK
PB+DUB
IC8
BX1048
QUASI VD
INSERT
BUFFER
BUFFER
WHITE
CLIP
TO T/T
TO CAMERA
JOG
CLIP
LEVEL
REC CHROMA
Q1
V BLK
PB CHROMA
SHIFT ADJ
IC7
BX1030
REF
4.43MHz
PHASE
SHIFT
90°
SHIFT
0°
180°
HD
PHASE
DET
LPF
VCO
JOG
AFC
IC6
BX1029
MULTIPLY
AMP
DET
INVERT
DET
S
R
Q
Q
Q̄
T
AUDIO
VIDEO
AUDIO
RF MODULATOR
RF OUT
D6
CN ON
RF CONT
IC5
BX1028
JOG
BURST
GATE
BURST FLAG
SUB BURST
CHROMA
PILOT BURST
CLEANING
1H DL CHROMA
PB CHROMA
1H DL
JOG
LEVEL
CLEANING FLAG

VIDEO Y SIGNAL SYSTEM BLOCK DIAGRAM

REC Y

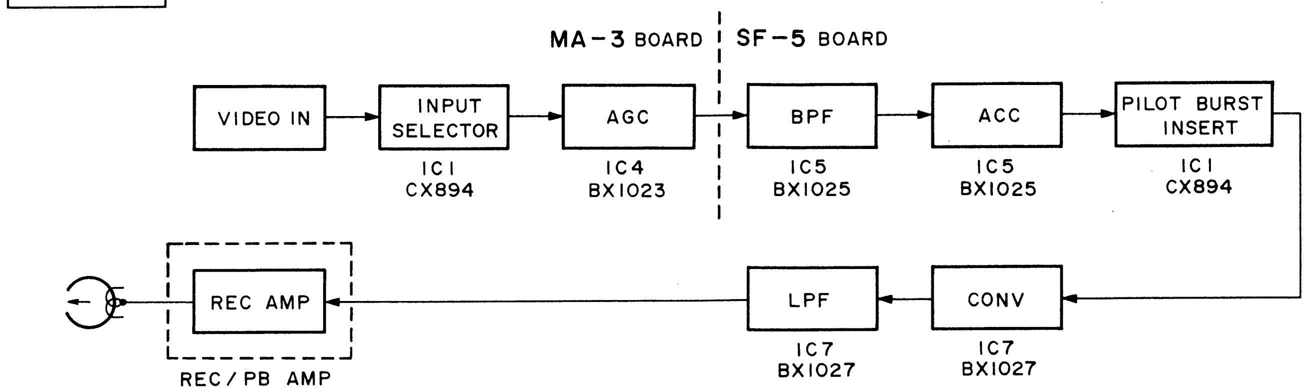

VIDEO IN
INPUT SELECTOR
IC1 CX894
AGC
IC4 BX1023
LPF
FL1
DEV AMP
IC4 BX1023
+NF NOICAN AMP
IC3 BX1024
VIDEO OUT
OUTPUT
IC8 BX1048
AMP
IC3 BX1024
SYNC SEP
IC4 BX1023
REC AMP
REC/PB AMP
FM MOD
IC3 BX1021
PRE-EMPHASIS
IC8 BX1032
CHROMA SIGNAL
SF-5 BOARD
MA-3 BOARD

PB Y

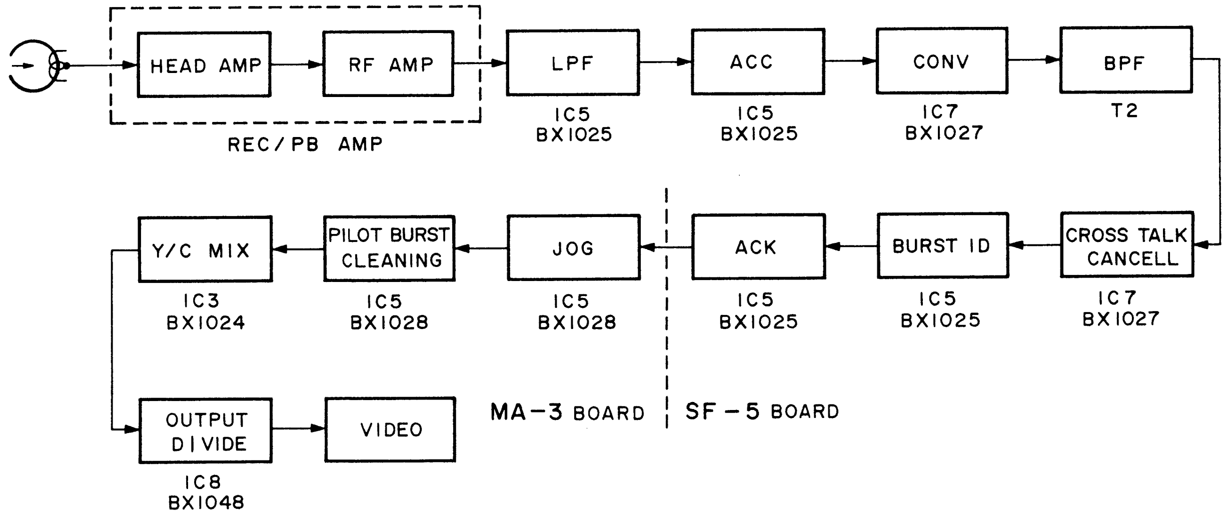

HEAD AMP
RF AMP
REC/PB AMP
LIMITER
IC1 TC7060AP
SL-3 BOARD
LIMITER/DEMOD
IC3 BX1021
EQ
IC9 BX1033
DE-EMPHASIS
IC10 BX1034
DOC DET
IC3 BX1021
V. MUTE
VIDEO OUT
OUTPUT DIVIDE
IC8 BX1048
Y/C MIX
IC3 BX1024
NOICAN
IC3 BX1024
AMP
IC4 BX1023
D.O.C. CROSS TALK CANCELL
IC4 BX1022
CHROMA SIGNAL
MA-3 BOARD
SF-5 BOARD

VIDEO CHROMA SYSTEM BLOCK DIAGRAM

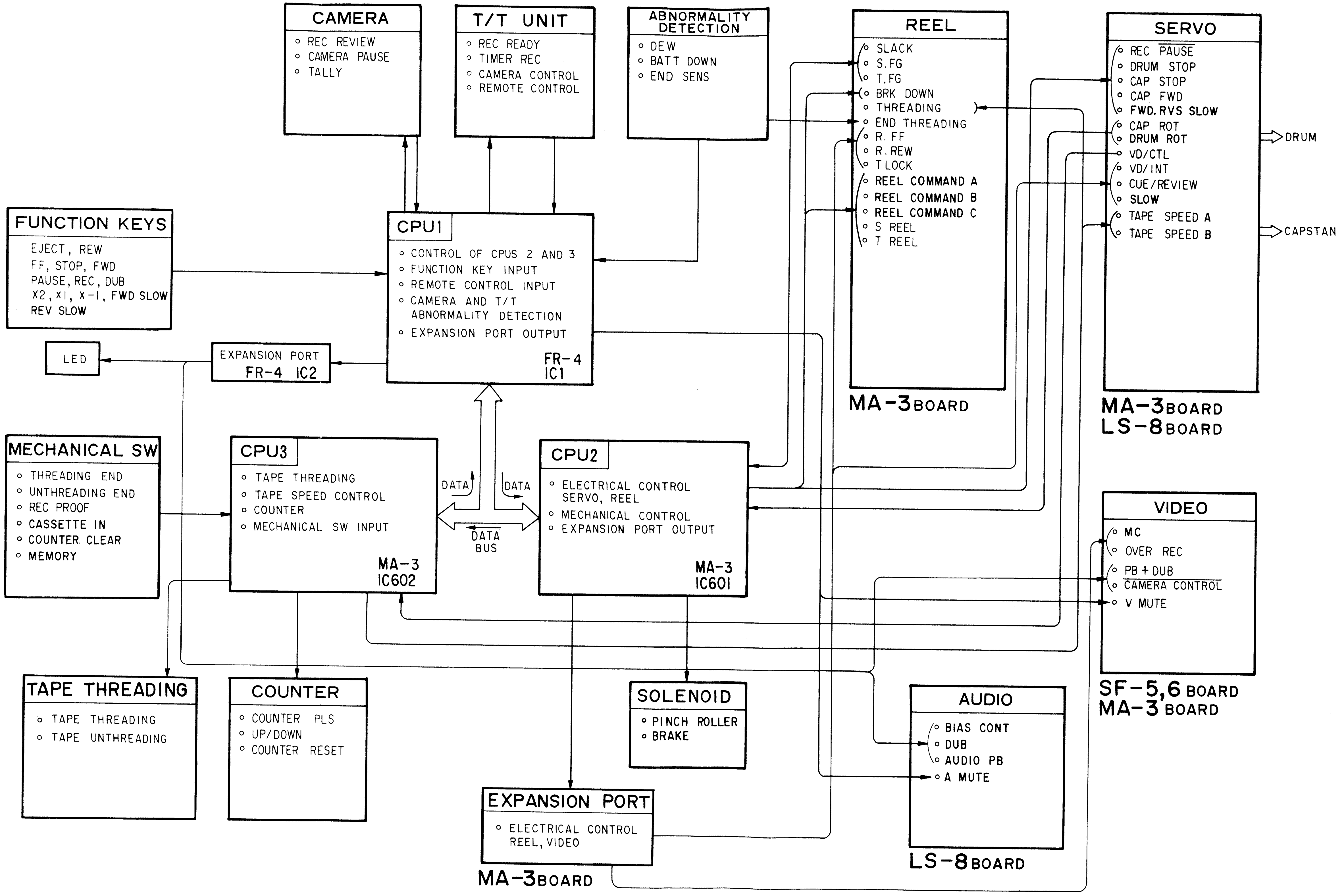
REC CHROMA


MA-3 BOARD
SF-5 BOARD
VIDEO IN
INPUT SELECTOR
IC1 CX894
AGC
IC4 BX1023
BPF
IC5 BX1025
ACC
IC5 BX1025
PILOT BURST INSERT
IC1 CX894
REC AMP
REC/PB AMP
LPF
IC7 BX1027
CONV
IC7 BX1027

PB CHROMA

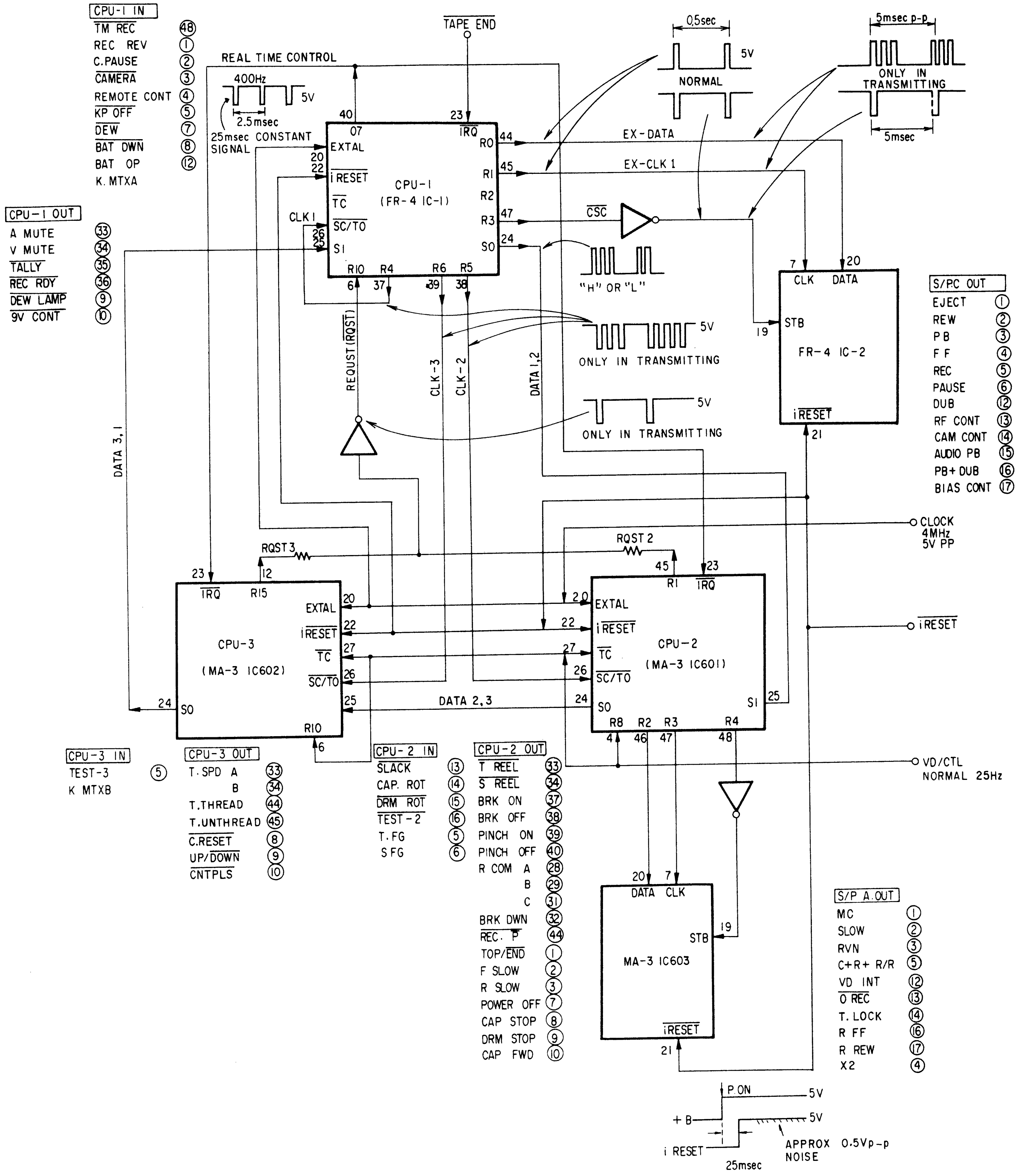

HEAD AMP
RF AMP
REC/PB AMP
LPF
IC5 BX1025
ACC
IC5 BX1025
CONV
IC7 BX1027
BPF
T2
Y/C MIX
IC3 BX1024
PILOT BURST CLEANING
IC5 BX1028
JOG
IC5 BX1028
ACK
IC5 BX1025
BURST ID
IC5 BX1025
CROSS TALK CANCELL
IC7 BX1027
OUTPUT DIVIDE
IC8 BX1048
VIDEO
MA-3 BOARD
SF-5 BOARD

SYSTEM CONTROL BLOCK DIAGRAM

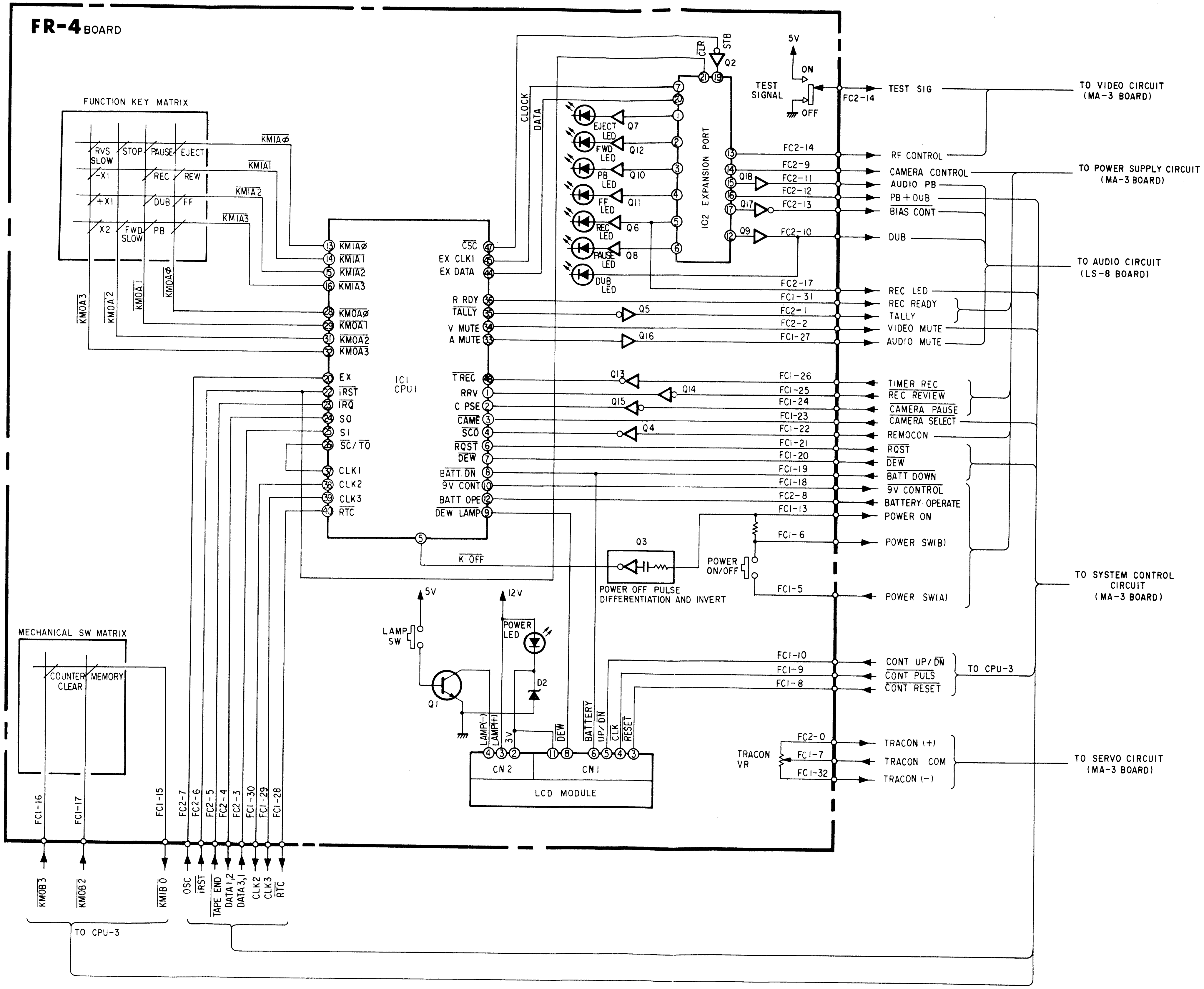

CAMERA
REC REVIEW
CAMERA PAUSE
TALLY
T/T UNIT
REC READY
TIMER REC
CAMERA CONTROL
REMOTE CONTROL
ABNORMALITY DETECTION
DEW
BATT DOWN
END SENS
REEL
SLACK
S.FG
T.FG
BRK DOWN
THREADING
END THREADING
R. FF
R. REW
T LOCK
REEL COMMAND A
REEL COMMAND B
REEL COMMAND C
S REEL
T REEL
MA-3 BOARD
SERVO
REC PAUSE
DRUM STOP
CAP STOP
CAP FWD
FWD. RVS SLOW
CAP ROT
DRUM ROT
VD/CTL
VD/INT
CUE/REVIEW
SLOW
TAPE SPEED A
TAPE SPEED B
DRUM
CAPSTAN
MA-3 BOARD
LS-8 BOARD
FUNCTION KEYS
EJECT, REW
FF, STOP, FWD
PAUSE, REC, DUB
X2, X1, X-1, FWD SLOW
REV SLOW
CPU1
CONTROL OF CPUS 2 AND 3
FUNCTION KEY INPUT
REMOTE CONTROL INPUT
CAMERA AND T/T ABNORMALITY DETECTION
EXPANSION PORT OUTPUT
FR-4 IC1
LED
EXPANSION PORT FR-4 IC2
MECHANICAL SW
THREADING END
UNTHREADING END
REC PROOF
CASSETTE IN
COUNTER CLEAR
MEMORY
CPU3
TAPE THREADING
TAPE SPEED CONTROL
COUNTER
MECHANICAL SW INPUT
MA-3 IC602
DATA
DATA
DATA BUS
CPU2
ELECTRICAL CONTROL SERVO, REEL
MECHANICAL CONTROL
EXPANSION PORT OUTPUT
MA-3 IC601
VIDEO
MC
OVER REC
PB + DUB
CAMERA CONTROL
V MUTE
SF-5,6 BOARD
MA-3 BOARD
TAPE THREADING
TAPE THREADING
TAPE UNTHREADING
COUNTER
COUNTER PLS
UP/DOWN
COUNTER RESET
SOLENOID
PINCH ROLLER
BRAKE
AUDIO
BIAS CONT
DUB
AUDIO PB
A MUTE
LS-8 BOARD
EXPANSION PORT
ELECTRICAL CONTROL REEL, VIDEO
MA-3 BOARD

SYSTEM CONTROL CPU SIGNAL FLOW

CPU CONTROL SIGNAL FLOW

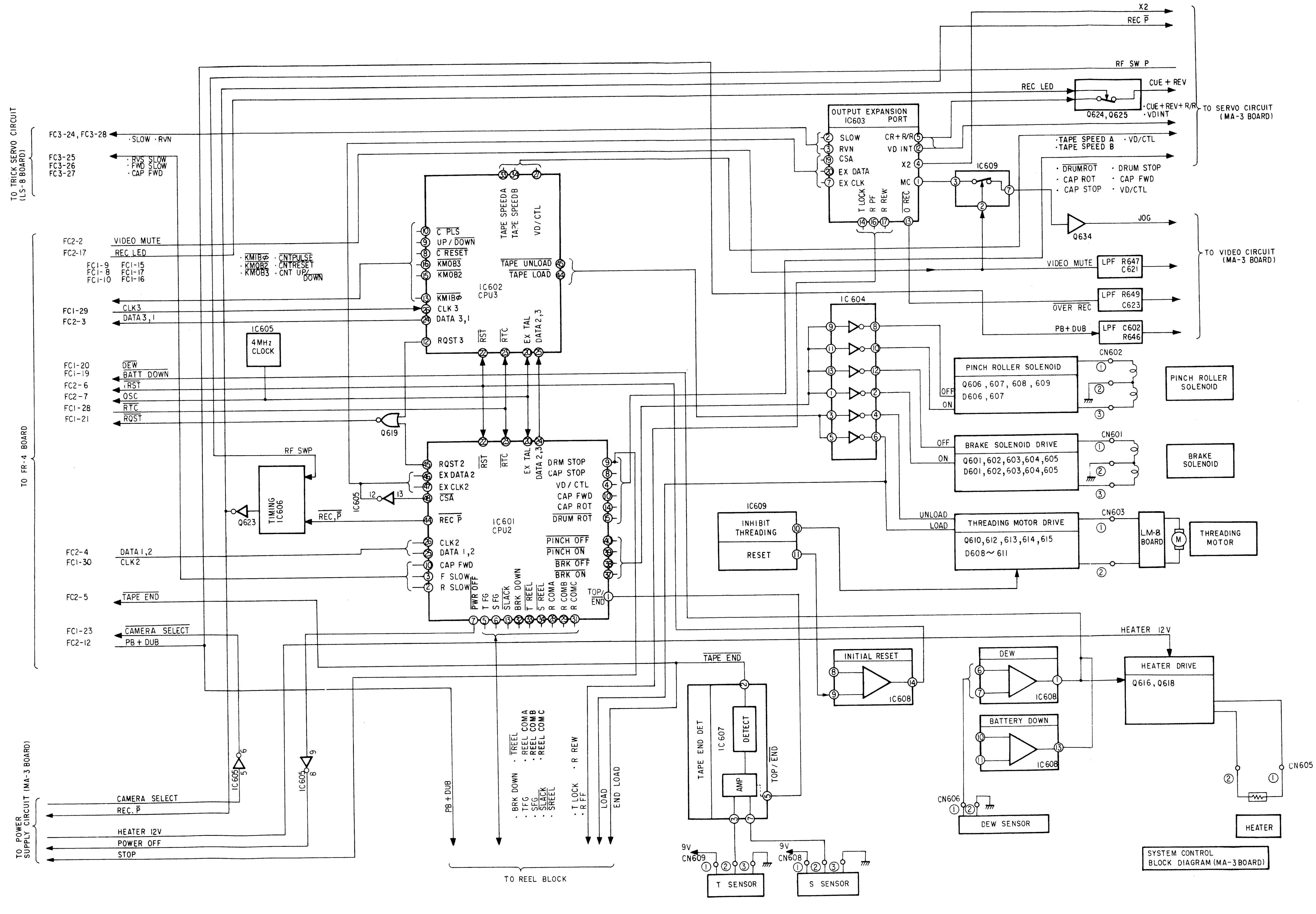

CPU-1 IN
TM REC ㊽
REC REV ①
C.PAUSE ②
CAMERA ③
REMOTE CONT ④
KP OFF ⑤
DEW ⑦
BAT DWN ⑧
BAT OP ⑫
K.MTXA
CPU-1 OUT
A MUTE ㉝
V MUTE ㉞
TALLY ㉟
REC RDY ㊱
DEW LAMP ⑨
9V CONT ⑩
REAL TIME CONTROL
400Hz
5V
2.5msec
25msec CONSTANT SIGNAL
TAPE END
CPU-1 (FR-4 IC-1)
EXTAL
i RESET
TC
SC/TO
SI
CLK1
IRQ
RO
RI
R2
R3
SO
R10 R4 R6 R5
EX-DATA
EX-CLK 1
CSC
"H" OR "L"
0.5sec
NORMAL
5msec p-p
ONLY IN TRANSMITTING
5msec
FR-4 IC-2
CLK DATA
STB
i RESET
S/PC OUT
EJECT ①
REW ②
PB ③
FF ④
REC ⑤
PAUSE ⑥
DUB ⑫
RF CONT ⑬
CAM CONT ⑭
AUDIO PB ⑮
PB+DUB ⑯
BIAS CONT ⑰
REQUST(RQST)
CLK-3
CLK-2
DATA 1,2
DATA 3,1
ONLY IN TRANSMITTING
CLOCK 4MHz 5V PP
i RESET
RQST 3
RQST 2
CPU-3 (MA-3 IC602)
IRQ R15
EXTAL
i RESET
TC
SC/TO
SO
R10
CPU-2 (MA-3 IC601)
R1 IRQ
EXTAL
i RESET
TC
SC/TO
SO
SI
R8 R2 R3 R4
DATA 2,3
VD/CTL NORMAL 25Hz
CPU-3 IN
TEST-3 ⑤
K MTXB
CPU-3 OUT
T.SPD A ㉝
B ㉞
T.THREAD ㊹
T.UNTHREAD ㊺
C.RESET ⑧
UP/DOWN ⑨
CNTPLS ⑩
CPU-2 IN
SLACK ⑬
CAP. ROT ⑭
DRM ROT ⑮
TEST-2 ⑯
T.FG ⑤
SFG ⑥
CPU-2 OUT
T REEL ㉝
S REEL ㉞
BRK ON ㊲
BRK OFF ㊳
PINCH ON ㊴
PINCH OFF ㊵
R COM A ㉘
B ㉙
C ㉛
BRK DWN ㉜
REC. P ㊹
TOP/END ①
F SLOW ②
R SLOW ③
POWER OFF ⑦
CAP STOP ⑧
DRM STOP ⑨
CAP FWD ⑩
MA-3 IC603
DATA CLK
STB
i RESET
S/P A.OUT
MC ①
SLOW ②
RVN ③
C+R+ R/R ⑤
VD INT ⑫
O REC ⑬
T. LOCK ⑭
R FF ⑯
R REW ⑰
X2 ④
P.ON
5V
+B
i RESET
25msec
APPROX 0.5Vp-p NOISE

SYSTEM CONTROL (FR-4 BOARD) BLOCK DIAGRAM



FR-4 BOARD
FUNCTION KEY MATRIX
RVS SLOW
STOP
PAUSE
EJECT
-X1
REC
REW
+X1
DUB
FF
X2
FWD SLOW
PB
KMIAØ
KMIA1
KMIA2
KMIA3
KMOA3
KMOA2
KMOA1
KMOAØ
IC1 CPU1
13 KMIAØ
14 KMIA1
15 KMIA2
16 KMIA3
28 KMOAØ
29 KMOA1
31 KMOA2
32 KMOA3
20 EX
22 IRST
23 IRQ
24 SO
25 SI
26 SC/TO
37 CLK1
38 CLK2
39 CLK3
40 RTC
CSC 47
EX CLK1 46
EX DATA 44
R RDY 36
TALLY 35
V MUTE 34
A MUTE 33
T REC 48
RRV 1
C PSE 2
CAME 3
SCO 4
RQST 6
DEW 7
BATT DN 8
9V CONT 10
BATT OPE 12
DEW LAMP 9
5
K OFF
CLOCK
DATA
CLR
STB
Q2
21
19
7
20
1
2
3
4
5
6
13
14
15
16
17
12
IC2 EXPANSION PORT
EJECT LED
Q7
FWD LED
Q12
PB LED
Q10
FF LED
Q11
REC LED
Q6
PAUSE LED
Q8
DUB LED
Q18
Q17
Q9
5V
ON
OFF
TEST SIGNAL
FC2-14
TEST SIG
FC2-14
RF CONTROL
FC2-9
CAMERA CONTROL
FC2-11
AUDIO PB
FC2-12
PB + DUB
FC2-13
BIAS CONT
FC2-10
DUB
FC2-17
REC LED
FC1-31
REC READY
Q5
FC2-1
TALLY
FC2-2
VIDEO MUTE
Q16
FC1-27
AUDIO MUTE
Q13
FC1-26
TIMER REC
Q14
FC1-25
REC REVIEW
Q15
FC1-24
CAMERA PAUSE
FC1-23
CAMERA SELECT
Q4
FC1-22
REMOCON
FC1-21
RQST
FC1-20
DEW
FC1-19
BATT DOWN
FC1-18
9V CONTROL
FC2-8
BATTERY OPERATE
FC1-13
POWER ON
FC1-6
POWER SW(B)
Q3
POWER ON/OFF
POWER OFF PULSE DIFFERENTIATION AND INVERT
FC1-5
POWER SW(A)
TO VIDEO CIRCUIT (MA-3 BOARD)
TO POWER SUPPLY CIRCUIT (MA-3 BOARD)
TO AUDIO CIRCUIT (LS-8 BOARD)
TO SYSTEM CONTROL CIRCUIT (MA-3 BOARD)
5V
12V
LAMP SW
POWER LED
D2
Q1
LAMP(-)
LAMP(+)
3V
DEW
BATTERY
UP/DN
CLK
RESET
4 3 2
11 8
6 5 4 3
CN 2
CN 1
LCD MODULE
FC1-10
CONT UP/DN
FC1-9
CONT PULS
FC1-8
CONT RESET
TO CPU-3
FC2-0
TRACON (+)
TRACON VR
FC1-7
TRACON COM
FC1-32
TRACON (-)
TO SERVO CIRCUIT (MA-3 BOARD)
MECHANICAL SW MATRIX
COUNTER CLEAR
MEMORY
FC1-16
FC1-17
FC1-15
FC2-7
FC2-6
FC2-5
FC2-4
FC2-3
FC1-30
FC1-29
FC1-28
KMOB3
KMOB2
KMIB0
OSC
IRST
TAPE END
DATA 1,2
DATA 3,1
CLK2
CLK3
RTC
TO CPU-3

SYSTEM CONTROL (MA-3 BOARD) BLOCK DIAGRAM


TO TRICK SERVO CIRCUIT (LS-8 BOARD)
FC3-24, FC3-28
·SLOW ·RVN
FC3-25
FC3-26
FC3-27
· RVS SLOW
· FWD SLOW
· CAP FWD
TO FR-4 BOARD
FC2-2
VIDEO MUTE
FC2-17
REC LED
FC1-9 FC1-15
FC1-8 FC1-17
FC1-10 FC1-16
· KMIBΦ · CNTPULSE
· KMOB2 · CNTRESET
· KMOB3 · CNT UP/DOWN
FC1-29
CLK3
FC2-3
DATA 3,1
IC605
4MHz CLOCK
FC1-20
DEW
FC1-19
BATT DOWN
FC2-6
RST
FC2-7
OSC
FC1-28
RTC
FC1-21
RQST
Q619
RF SWP
TIMING IC606
Q623
REC.P
FC2-4
DATA 1,2
FC1-30
CLK2
FC2-5
TAPE END
FC1-23
CAMERA SELECT
FC2-12
PB + DUB
TO POWER SUPPLY CIRCUIT (MA-3 BOARD)
CAMERA SELECT
REC. P
HEATER 12V
POWER OFF
STOP
IC605 6 5
IC605 9 8
IC602 CPU3
C PLS
UP/DOWN
C RESET
KMOB3
KMOB2
KMIBΦ
CLK 3
DATA 3,1
RQST 3
TAPE SPEEDA
TAPE SPEEDB
VD/CTL
TAPE UNLOAD
TAPE LOAD
RST
RTC
EX TAL
DATA 2,3
IC601 CPU2
RQST 2
EX DATA 2
EX CLK2
CSA
REC P
CLK2
DATA 1,2
CAP FWD
F SLOW
R SLOW
DRM STOP
CAP STOP
VD/CTL
CAP FWD
CAP ROT
DRUM ROT
PINCH OFF
PINCH ON
BRK OFF
BRK ON
TOP/END
PWR OFF
T FG
S FG
SLACK
BRK DOWN
T REEL
S REEL
R COMA
R COMB
R COMC
12 13
PB + DUB
· BRK DOWN · TREEL
· TFG · REEL COMA
· SFG · REEL COMB
· SLACK · REEL COMC
· SREEL
· T LOCK · R REW
· R FF
LOAD
END LOAD
TO REEL BLOCK
X2
REC P
RF SW P
REC LED
CUE + REV
Q624, Q625
·CUE+REV+R/R
·VDINT
TO SERVO CIRCUIT (MA-3 BOARD)
OUTPUT EXPANSION PORT IC603
SLOW
RVN
CSA
EX DATA
EX CLK
CR+R/R
VD INT
X2
MC
T LOCK
R PF
R REW
O REC
·TAPE SPEED A ·VD/CTL
·TAPE SPEED B
IC609
· DRUMROT · DRUM STOP
· CAP ROT · CAP FWD
· CAP STOP · VD/CTL
JOG
Q634
VIDEO MUTE
LPF R647 C621
TO VIDEO CIRCUIT (MA-3 BOARD)
OVER REC
LPF R649 C623
PB+ DUB
LPF C602 R646
IC 604
PINCH ROLLER SOLENOID
Q606, 607, 608, 609
D606, 607
OFF
ON
CN602
PINCH ROLLER SOLENOID
BRAKE SOLENOID DRIVE
Q601, 602, 603, 604, 605
D601, 602, 603, 604, 605
CN601
BRAKE SOLENOID
IC609
INHIBIT THREADING
RESET
UNLOAD
LOAD
THREADING MOTOR DRIVE
Q610, 612, 613, 614, 615
D608 ~ 611
CN603
LM-8 BOARD
M
THREADING MOTOR
HEATER 12V
TAPE END
INITIAL RESET
IC608
DEW
IC608
BATTERY DOWN
IC608
HEATER DRIVE
Q616, Q618
TAPE END DET
IC 607
DETECT
AMP
TOP/END
9V
CN609
T SENSOR
9V
CN608
S SENSOR
CN606
DEW SENSOR
CN605
HEATER
SYSTEM CONTROL BLOCK DIAGRAM (MA-3 BOARD)

SYSTEM CONTROL CIRCUIT AND SERVO CIRCUIT INTERFACE

MODE SIGNAL	I/O	Pin No.	STOP	PB	REC	FF	REW	CUE	REV	PB PAUSE	REC PAUSE	THREADING	EJECT	DUB	DUB PAUSE
VD/CTL	I'	CPU2.3 27 Pin (TC) CPU2 4 Pin (R8) CPU3 6 Pin (R10)	——	CTL	VD	CTL	CTL	CTL	CTL	——	TAPE RUNS CTL	——	——	CTL	——
$\overline{\text{DRM ROT}}$	I'	CPU2 15 Pin (K2)	H	L	L	L	L	L	L	L	L	H	H	L	L
CAP ROT	I'	CPU2 14 Pin (K1)	L	H	H	L	L	H	H	L	L	L	L	H	L
RF SW PLS*2	I'	IC606 (TC4013) 11 Pin IC606 (TC4013) 3 Pin	disappear	appear	appear	appear	appear	appear	appear	appear	appear	disappear	disappear	appear	appear
TAPE SPEED (A) *3	O	CPU3 33 Pin (O0)													
TAPE SPEED (B)	O	CPU3 34 Pin (O1)													
DRM STOP	O	CPU2 9 Pin (R13)	H	L	L	L	L	L	L	L	L	H	H	L	L
CAP STOP	O	CPU2 8 Pin (R12)	H	L	L	H	H	L	L			H	H	L	
VD INT	O	IC603 (MB8747) 12 Pin (P7)	L	H	L	L	L	H	H	H	*9 L	L	L	H	H
REC·$\overline{\text{PAUSE}}$*4	O	CPU2 44 Pin (R0)	H	H	L*7	H	H	H	H	H	H	H	H	H	H
CUE + REV	O	IC603 (MB8747) 5 Pin (P5)	L	L	L	L	L	H	H	L	L	L	L	L	L
CAP FWD	O	CPU2 10 Pin (R14)	H*5	H	H	H	L	H	L	*6	*6	H*5	H*5	H	H

*1 "L" during capstan servo unlocked, "H" locked
*2 30 Hz, 50% duty ratio pulse
*3 3 bit binary coded tape speed
*4 latched output by flip-flop, clock pulses for the flip-flop are rf sw pulses.
*5 no use in this mode
*6 "H" when tape runs forward, "L" when tape runs reverse, holdes the previous level in stop mode
*7 "H" while counting 12 CTL after record panse mode, since then "L"
*8 holds the previous level
*9 when in record-review mode

SYSTEM CONTROL CIRCUIT AND VIDEO CIRCUIT INTERFACE

MODE SIGNAL	I/O	Pin No.	STOP	PB	REC	FF	REW	CUE	REV	PB PAUSE	REC PAUSE	THREADING	EJECT	DUB	DUB PAUSE
$\overline{\text{OVER REC}}$	O	IC603 (MB8747) 13 Pin (P8)	H	H	H*1	H	H	H	H	H	H	H	H	H	H
PB + DUB	O	IC2 (MB8747) 16 Pin (P11)	L	H	L	L	L	H	H	H	*10 L	L	L	H	H
VMUTE*2	O	CPU1 34 Pin (O1)	L	L*3	L	L	L	L	L	L	L	L	L	L*3	L
$\overline{\text{REC·}\overline{\text{PAUSE}}}$*4	O	CPU2 44 Pin (R0)	H	H	L*7	H	H	H	H	H	H	H	H	H	H
MC	O	IC603 (MB8747) 1 Pin (P1)	L	L	L	L	L	H	H	H	*11 L	L	L	L	H
$\overline{\text{9V CONT}}$	O	CPU1 10 Pin (R11)	L*5	L	L	L	L	L	L	L	L	L	L	L	L
RF CONT	O	IC2 (MB8747) 13 Pin (P8)	H*6	H	H*6	H*6	H*6	H	H	H	H*6	H*6	H*6	H	H
CAME CONT*8	O	IC2 (MB8747) 14 Pin (P9)	H*9	H	H	H*9	H*9	H	H	H	H	H*9	H*9	H	H

*1 "L" is appear during 12 sec in strong signal recording for splicing
*2 "H" when no CTL period become 0.5 sec, the CTLS are detected during more than 0.5 sec, the level changed
*3 "H" is held during 3 second when in playback mode or in dubbing mode after stop mode
*4 output latched by flip-flop, the clock signal for the flip-flop, is rf sw pulse
*5 "H" during battery operate
*6 "L" during battery operate, "H" when in record-review mode or record/playback after releasing record pause
*7 "H" is held during 12 CTL in record mode after releasing record pause, since then "L"
*8 "L" except for camera mode
*9 "L" when camera mode and battery operate
*10 "H" during record-review mode
*11 "H" during record-review mode

SYSTEM CONTROL CIRCUIT AND REEL MOTOR CIRCUIT INTERFACE

SIGNAL \ MODE	I/O	Pin No.	STOP	PB	REC	FF	REW	CUE	REV	PB PAUSE	REC PAUSE	THREADING	EJECT	DUB	DUB PAUSE
T FG	I	CPU2 5 Pin (R9)	——	←					*1						→
S FG	I	CPU2 6 Pin (R10)	——	←					*1						→
$\overline{\text{SLACK}}$	I	CPU2 13 Pin (K0)	——	——	——	"H": NORMALITY "L": ABNORMALITY	"H": NORMALITY "L": ABNORMALITY	——	——	——	——	——	——	——	——
BRK DOWN*2	O	CPU2 32 Pin (P3)	L	L	L	L	L	L	L	L	L	L	L	L	L
$\overline{\text{T END}}$*6	O	IC610 ( ) 4 Pin													
T LOCK	O	IC603 (MB8747) 14 Pin (P9)	L	L	L	L	L	L	L	L	L	H	H	L	L
R FF	O	IC603 (MB8747) 16 Pin (P11)	L	L	L	H	L	L	L	L	L	L	L	L	L
R REW	O	IC603 (MB8747) 17 Pin (P12)	L	L	L	L	H	L	L	L	L	L	L	L	L
R COM A	O	CPU2 28 Pin (P0)	*3	L	L	L	H	L	H	L*4	L*5	L	L	L	L*3
R COM B	O	CPU2 29 Pin (P1)	*3	L	L	H	H	L	L	L	L	H	H	L	L*3
R COM C	O	CPU2 31 Pin (P2)	*3	L	L	L	L	H	H	L	L*5	H	H	L	L*3
$\overline{\text{T REEL}}$	O	CPU2 33 Pin (O0)	H	L	L	L	H	L	L	L	L	L	L	L	L
$\overline{\text{S REEL}}$	O	CPU2 34 Pin (O1)	H	L	L	H	L	L	L	L	L	L	L	L	L
$\overline{\text{T THREAD}}$	O	CPU3 44 Pin (R0)	H	H	H	H	H	H	H	H	H	L	H	H	H

*1 numbers of pulse equal to numbers of reel revolution multiplied 60
*2 changing signal for electrical brake
*3 no use in this mode
*4 "H" when tape runs reverse in SWING SEARCH mode
*5 "H" when in record-review mode
*6 "H" at tape end

SYSTEM CONTROL CIRCUIT AND AUDIO CIRCUIT INTERFACE

SIGNAL \ MODE	I/O	Pin No.	STOP	PB	REC	FF	REW	CUE	REV	PB PAUSE	REC PAUSE	THREADING	EJECT	DUB	DUB PAUSE
AUDIO PB*2	O	FC3-36 IC2 (MB8747) 15 Pin (P10)	L	H	L	L	L	H	H	H*1	*8 L	L	L	L	L
DUB	O	FC3-35 IC2 (MB8747) 12 Pin (P7)	L*3	L	L	L	L	L	L	L	L	L	L	H	H
BIAS CONT	O	FC3-34 IC2 (MB8747) 17 Pin (P12)	L	L	H*4	L	L	L	L	L	L	L	L	H*5	L
A MUTE*6	O	FC3-37 CPU1 33 Pin (O0)	H	L*7	H	H	H	H	H	H	H *9	H	H	H	H

*1 includes double speed play and SWING SEARCH play
*2 level is changed after 40 msec delay
*3 "H" is held during 150 msec in stop mode after dubbing, "H" since then"L"
*4 "L" is held during 12 CTL in record mode after record pause mode, since then "H"
*5 "L" is held during 50 msec in dubbing mode after stop mode, since then "H"
*6 "H" when no CTL peried become 0.5 sec, the CTLs are detected during more than 0.5 sec, the level is changed
*7 "H" is held during 3 sec in playback mode after stop/FF and is held during 0.5 sec, since then "L"
*8 when in record-review mode
*9 "H" is held during 0.5 sec in record mode after record-review mode, since then "L"

SYSTEM CONTROL CIRCUIT AND TUNER/TIMER CIRCUIT, POWER SUPPLY CIRCUIT INTERFACE

SIGNAL \ MODE	I/O	Pin No.	STOP	PB	REC	FF	REW	CUE	REV	PB PAUSE	REC PAUSE	THREADING	EJECT	DUB	DUB PAUSE
POWER SW (A)[1]	I														
POWER SW (B)[1]	O														
REC REVIEW[2]	I	CPU1 1 Pin (R5)													
CAMERA PAUSE[3]	I	CPU1 2 Pin (R6)													
$\overline{\text{CAMERA}}$[4]	I	CPU1 3 Pin (R7)													
$\overline{\text{REMOCON}}$[5]	I	CPU1 4 Pin (R8)													
$\overline{\text{TALLY}}$[6]	O	CPU1 35 Pin (O2)	H	L[7]	L	H	H	H	H	H	[9] H	H	H	L	H
$\overline{\text{REC READY}}$	O	CPU1 36 Pin (O3)													
$\overline{\text{TIMER REC}}$	I	CPU1 48 Pin (R4)													
PB + DUB	O	IC2 (MB8747) 16 Pin (P11)	L	H	L	L	L	H	H	H	L	L	L	H	H
BATT OPERATE[8]	I	CPU1 12 Pin (R15)													
POWER ON[1]	O														
$\overline{\text{POWER OFF}}$[1]	O	CPU2 7 Pin (R11)													

[1] power on/off signal during battery operate or ac adaptor operate

[2] "H" when RECORD REVIEW button is depressed

[3] "H" when PAUSE button of the camera is depressed

[4] "L" when in camera mode

[5] SONY's infrared remote control system serial data from remote control CPU to system control CPU

[6] TALLY will wink 1 Hz 5% duty ratio when become poor charge voltage of the battery

[7] includes double speed mode

[8] "H" during battery operate

[9] "L" when in record-review mode

SYSTEM CONTROL CIRCUIT AND SLOW PLAY CONTROL CIRCUIT INTERFACE

SIGNAL \ MODE	I/O	Pin No.	STOP	PB	REC	FF	REW	CUE	REV	PB PAUSE	REC PAUSE	THREADING	EJECT	DUB	DUB PAUSE
CAP FWD	O	FC3-27 CPU2 10 Pin (R14)	H[1]	H	H	H	L	H	L	[2]	[2]	H[1]	H[1]	H	H
RVN	O	FC3-28 IC603 (MB8747) 3 Pin (P3)	L	L	L	L	L	L	L	L	[6] L	L	L	L	L
SLOW	O	FC3-24 IC603 (MB8747) 2 Pin (P2)	L	L	L	L	L	L	L	H[3]	[7] H	L	L	L	H
FWD SLOW	O	FCS-26 CPU2 2 Pin (R6)	L	L	L	L	L	L	L	L[4]	L	L	L	L	L
RVS SLOW	O	FCS-25 CPU2 3 Pin (R7)	L	L	L	L	L	L	L	L[5]	L	L	L	L	L

[1] no use in this mode

[2] "H" when tape runs forward, "L" when tape runs reverse, holds previous level in stop mode

[3] "L" when tape runs normal speed forward or normal speed reverse

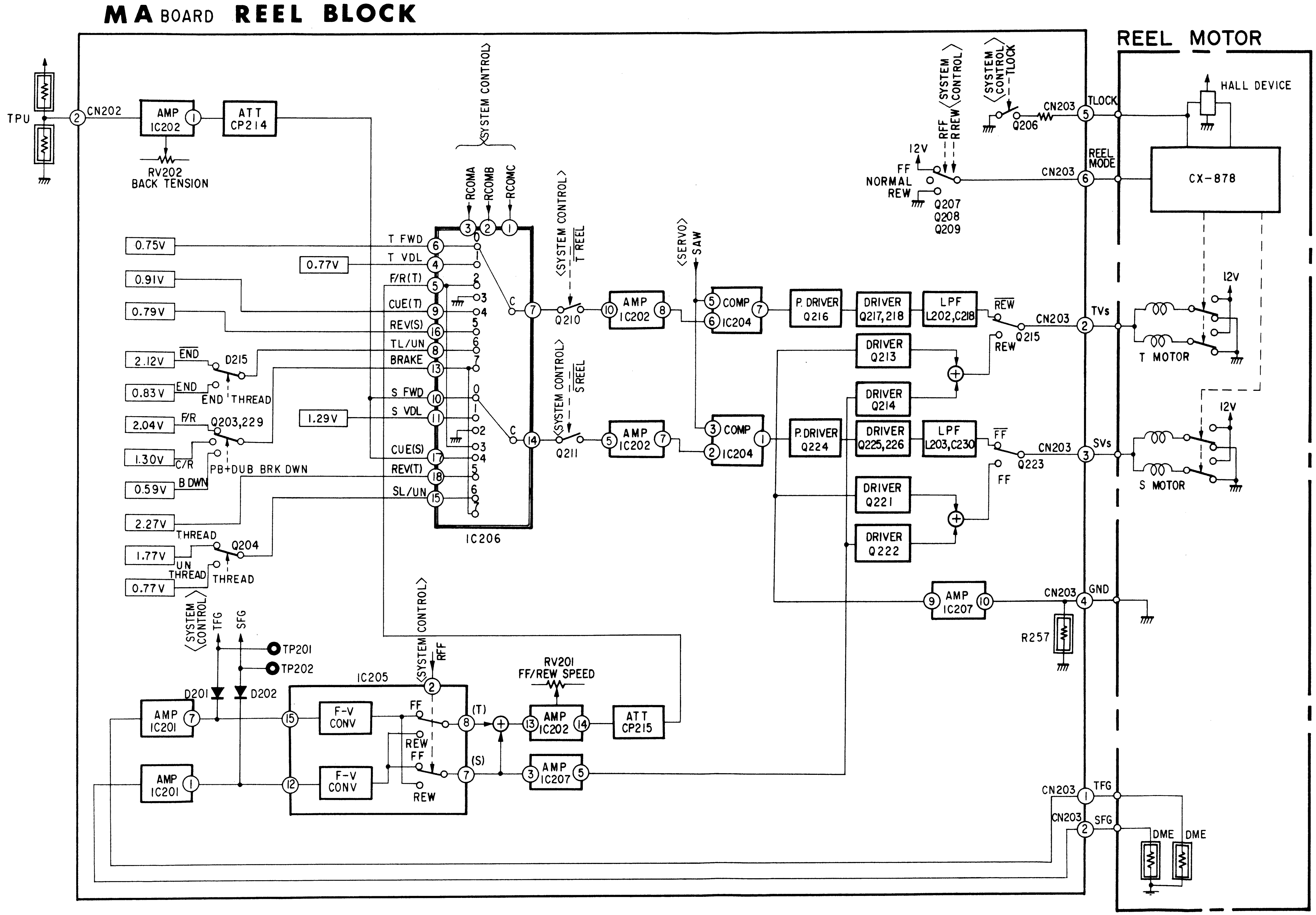
[4] "H" when in forward slow motion

[5] "H" when in reverse slow motion

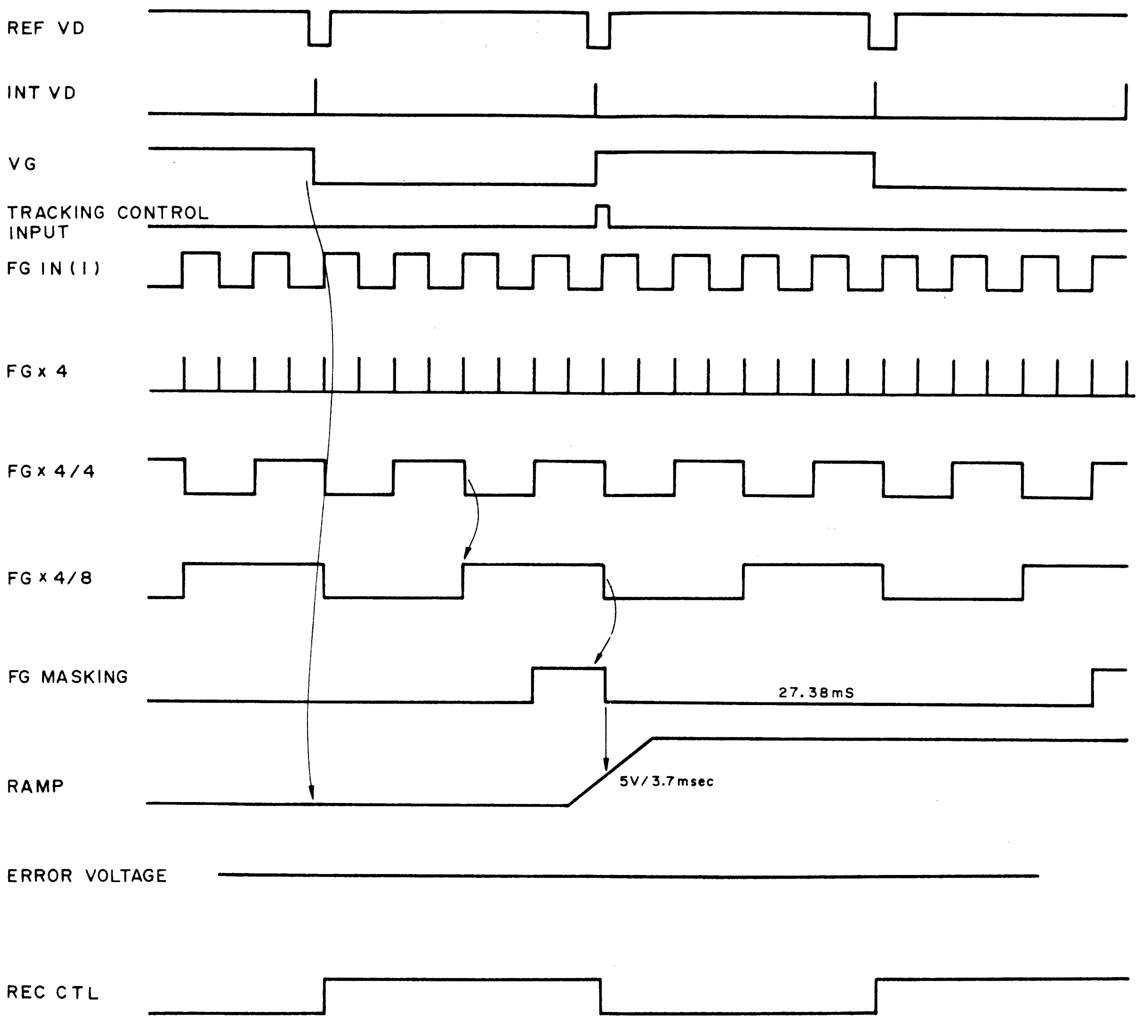
[6] "H" when in record-review mode

[7] "L" when in record-review mode

REEL SERVO BLOCK DIAGRAM

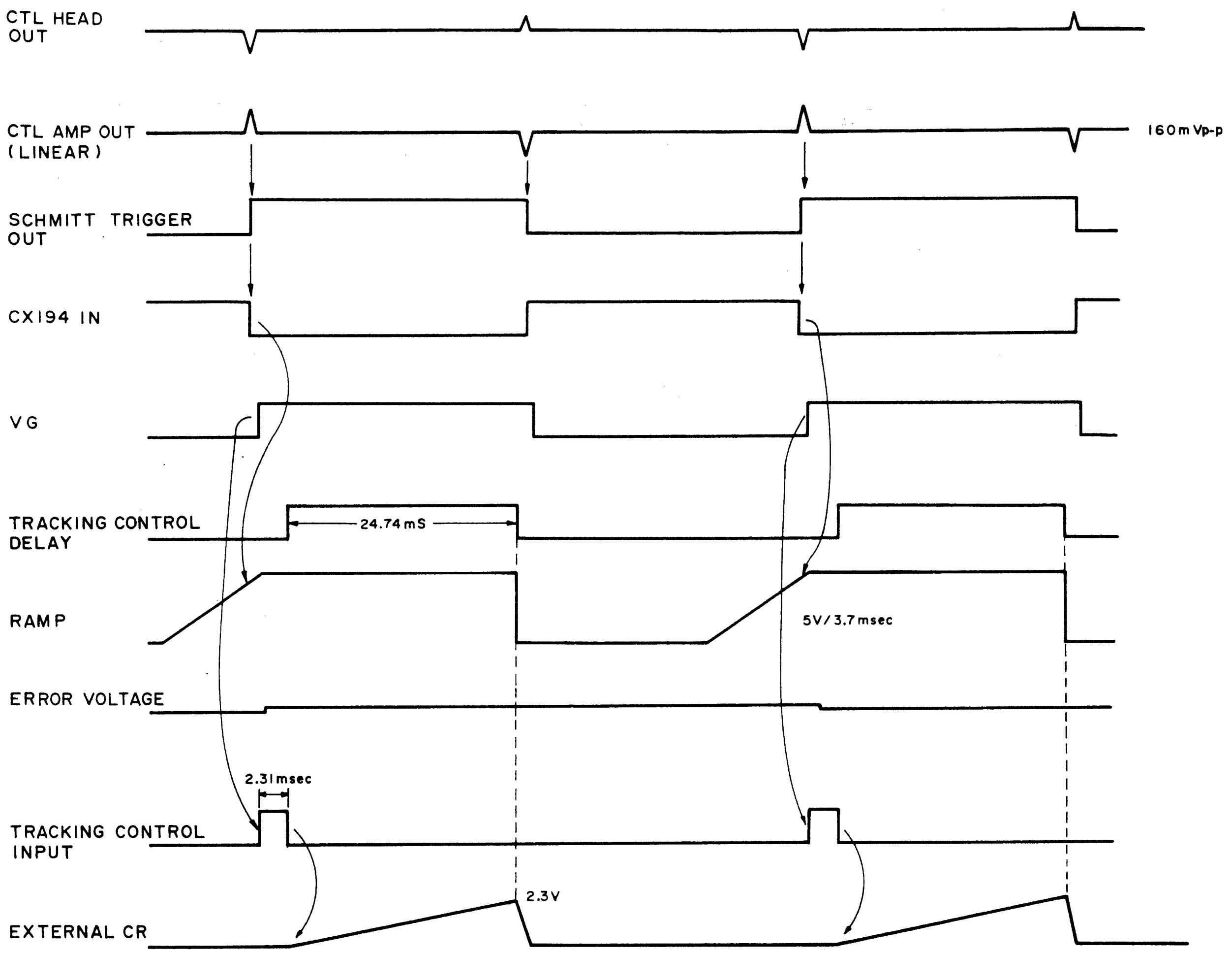

MA BOARD REEL BLOCK
REEL MOTOR
TPU
CN202
AMP IC202
ATT CP214
RV202 BACK TENSION
〈SYSTEM CONTROL〉
RCOMA
RCOMB
RCOMC
0.75V
0.77V
0.91V
0.79V
2.12V
0.83V
2.04V
1.30V
0.59V
2.27V
1.77V
0.77V
1.29V
END
D215
END THREAD
F/R
Q203,229
C/R
PB+DUB BRK DWN
B DWN
THREAD
Q204
UN THREAD
T FWD
T VDL
F/R(T)
CUE(T)
REV(S)
TL/UN
BRAKE
S FWD
S VDL
CUE(S)
REV(T)
SL/UN
IC206
〈SYSTEM CONTROL〉 T REEL
〈SYSTEM CONTROL〉 S REEL
Q210
Q211
AMP IC202
〈SERVO〉 SAW
COMP IC204
P. DRIVER Q216
DRIVER Q217,218
LPF L202,C218
DRIVER Q213
DRIVER Q214
P. DRIVER Q224
DRIVER Q225,226
LPF L203,C230
DRIVER Q221
DRIVER Q222
REW
Q215
FF
Q223
CN203
TLOCK
REEL MODE
TVs
SVs
GND
TFG
SFG
〈SYSTEM CONTROL〉 TLOCK
Q206
〈SYSTEM CONTROL〉 RFF RREW
12V
FF
NORMAL
REW
Q207 Q208 Q209
HALL DEVICE
CX-878
T MOTOR
S MOTOR
DME
AMP IC207
R257
〈SYSTEM CONTROL〉 TFG
SFG
TP201
TP202
D201
D202
AMP IC201
IC205
F-V CONV
〈SYSTEM CONTROL〉 RFF
(T)
(S)
RV201 FF/REW SPEED
AMP IC202
ATT CP215
AMP IC207

CAPSTAN PHASE CONTROL SYSTEM TIMING CHART (RECORD MODE)



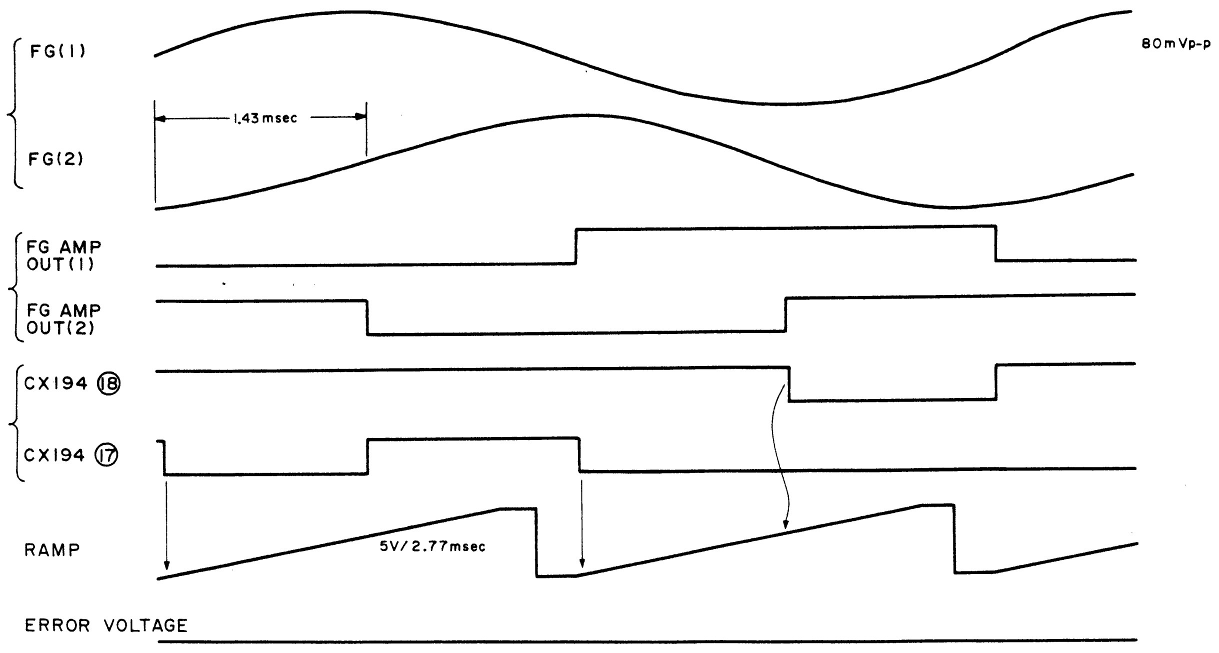
REF VD
INT VD
VG
TRACKING CONTROL INPUT
FG IN (1)
FG x 4
FG x 4/4
FG x 4/8
FG MASKING
27.38mS
RAMP
5V/3.7msec
ERROR VOLTAGE
REC CTL

CAPSTAN PHASE CONTROL SYSTEM TIMING CHART (PLAYBACK MODE)



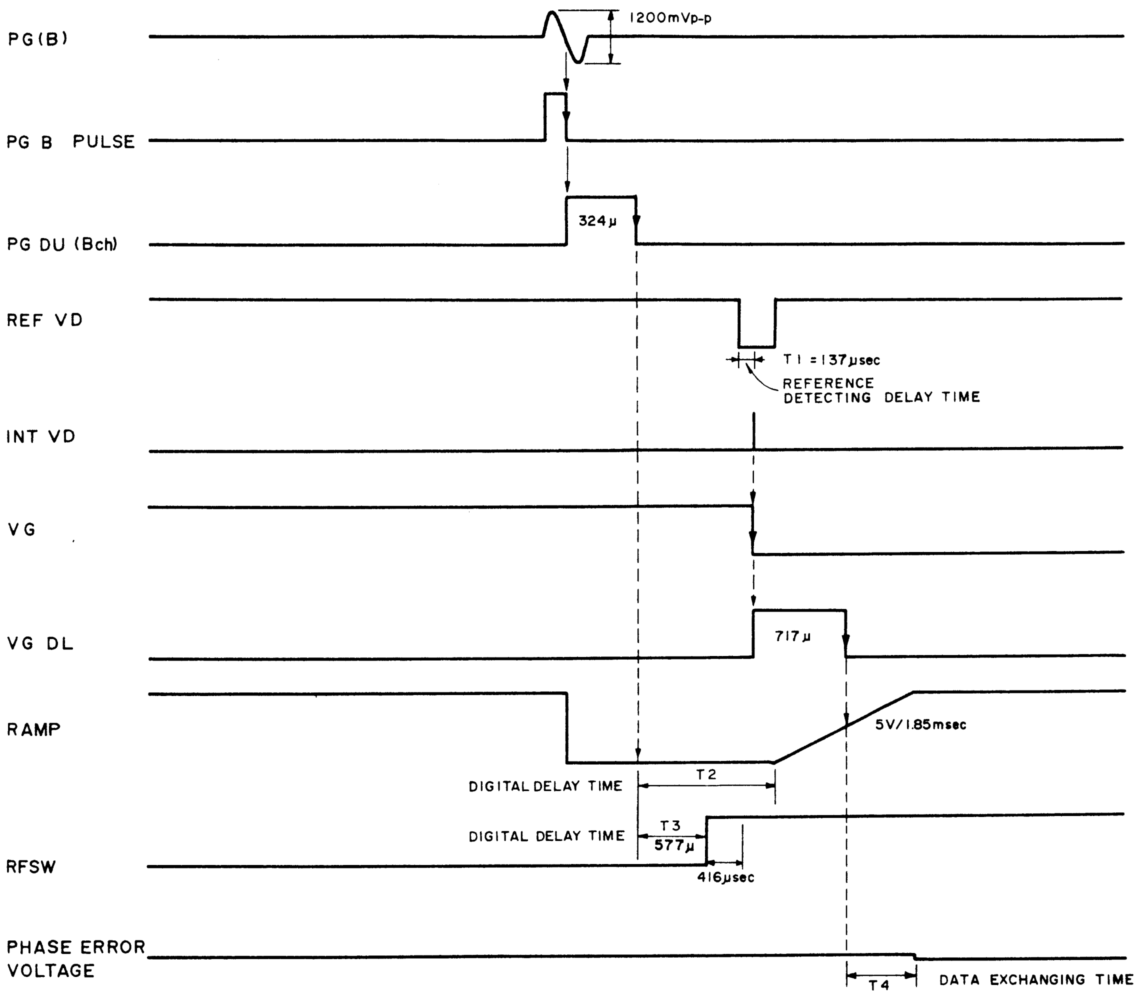
CTL HEAD OUT
CTL AMP OUT (LINEAR)
160mVp-p
SCHMITT TRIGGER OUT
CX194 IN
VG
TRACKING CONTROL DELAY
24.74mS
RAMP
5V/3.7msec
ERROR VOLTAGE
2.31msec
TRACKING CONTROL INPUT
2.3V
EXTERNAL CR

CAPSTAN SPEED CONTROL SYSTEM TIMING CHART

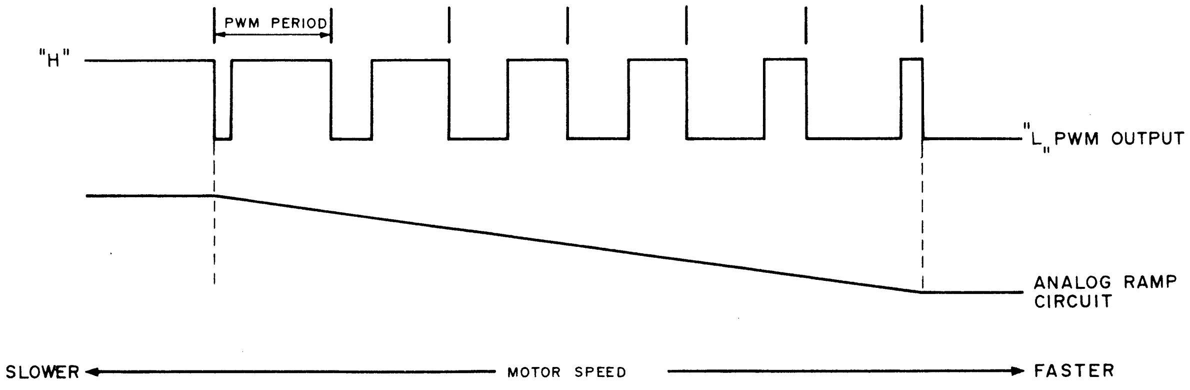


FG(1)
80mVp-p
1.43msec
FG(2)
FG AMP OUT(1)
FG AMP OUT(2)
CX194 ⑱
CX194 ⑰
RAMP
5V/2.77msec
ERROR VOLTAGE

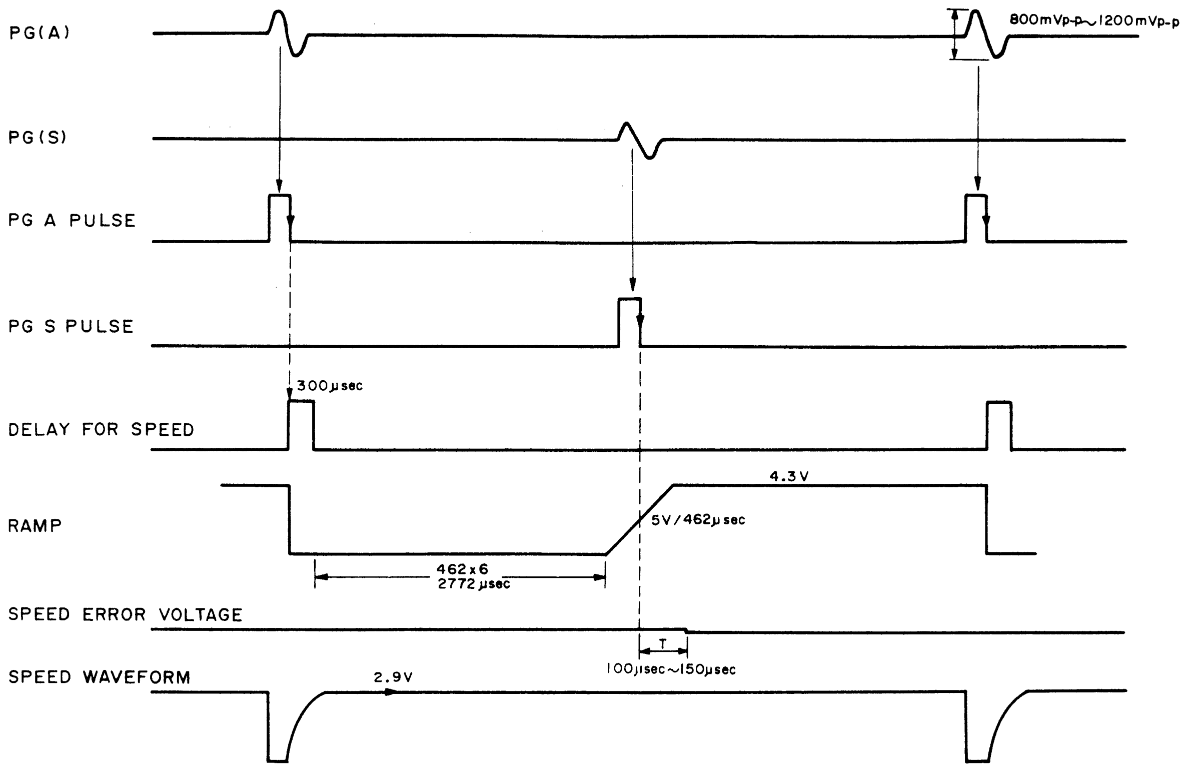
DRUM PHASE SYSTEM TIMING CHART


PG(B)
1200mVp-p
PG B PULSE
PG DU (Bch)
324μ
REF VD
T1 = 137μsec
REFERENCE DETECTING DELAY TIME
INT VD
VG
VG DL
717μ
RAMP
5V/1.85msec
DIGITAL DELAY TIME
T2
DIGITAL DELAY TIME
T3
577μ
RFSW
416μsec
PHASE ERROR VOLTAGE
T4
DATA EXCHANGING TIME

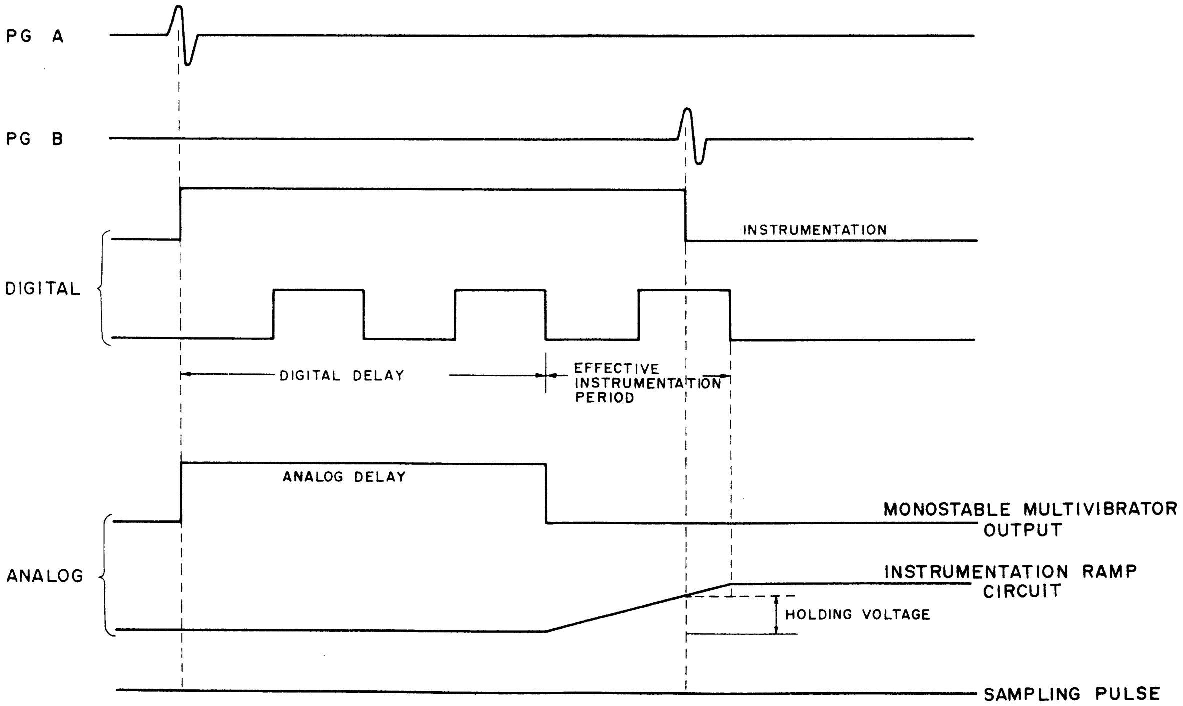
INSTRUMENTATION COUNTER TIMING CHART


PWM PERIOD
"H"
"L" PWM OUTPUT
ANALOG RAMP CIRCUIT
SLOWER
MOTOR SPEED
FASTER

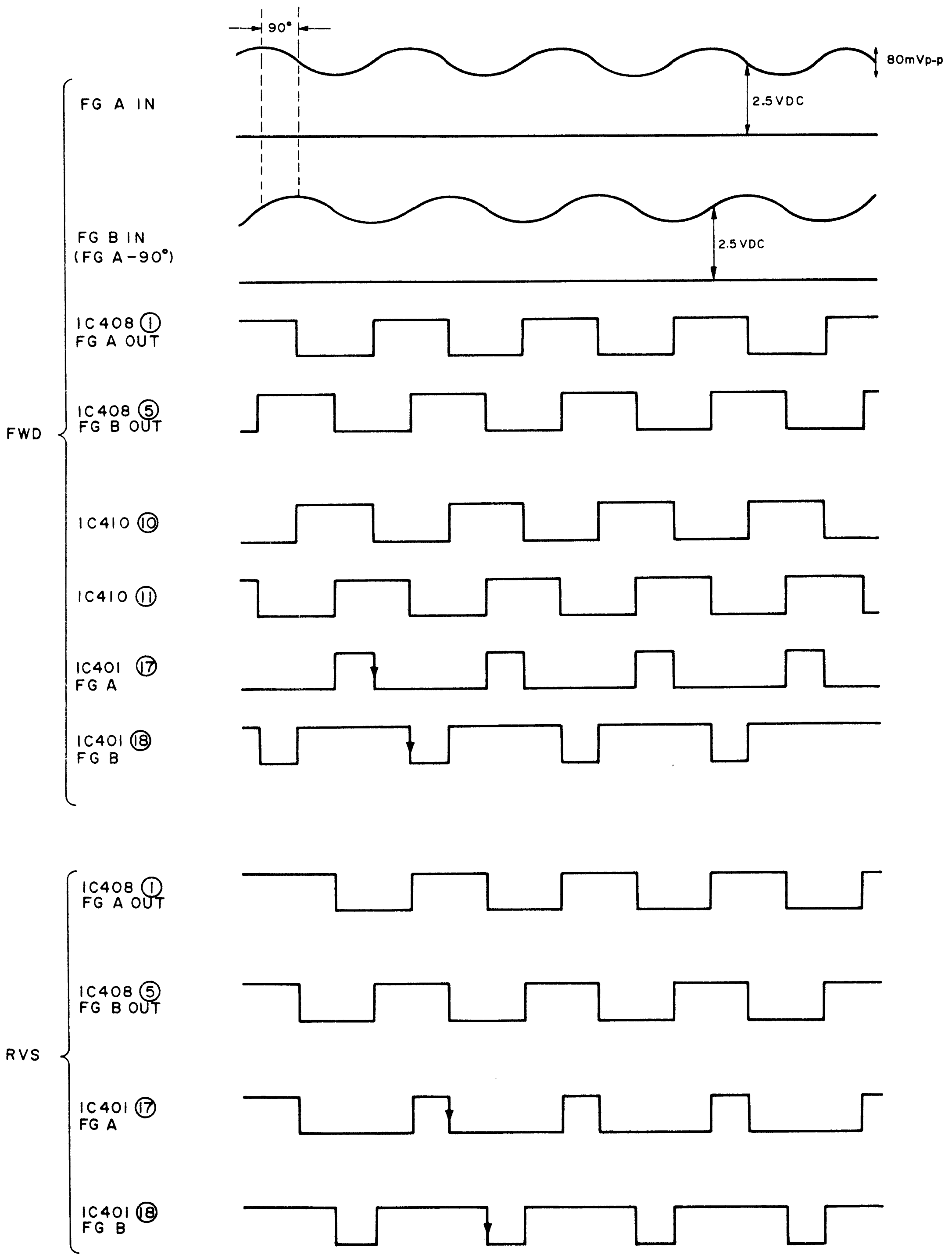
DRUM SPEED SYSTEM TIMING CHART


PG(A)
800mVp-p~1200mVp-p
PG(S)
PG A PULSE
PG S PULSE
300μsec
DELAY FOR SPEED
4.3V
RAMP
5V/462μsec
462x6
2772μsec
SPEED ERROR VOLTAGE
T
100μsec~150μsec
SPEED WAVEFORM
2.9V

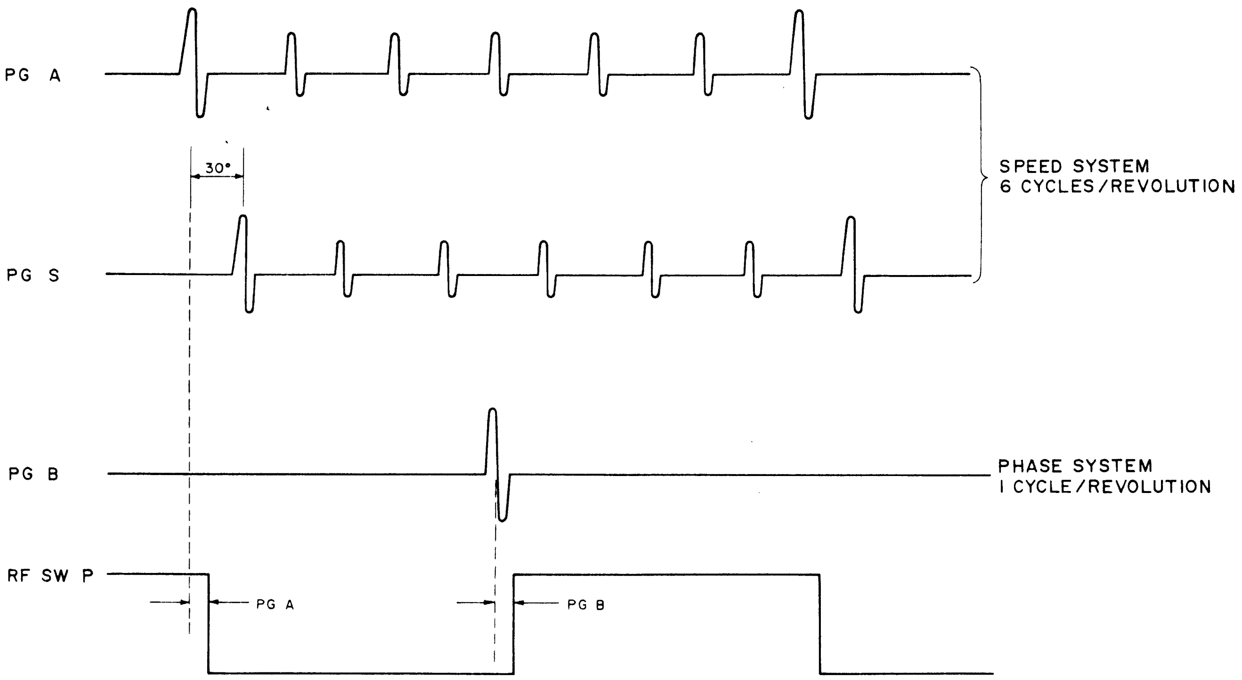
INSTRUMENTATION PERIOD PRODUCE TIMING CHART


PG A
PG B
INSTRUMENTATION
DIGITAL
DIGITAL DELAY
EFFECTIVE INSTRUMENTATION PERIOD
ANALOG DELAY
MONOSTABLE MULTIVIBRATOR OUTPUT
ANALOG
INSTRUMENTATION RAMP CIRCUIT
HOLDING VOLTAGE
SAMPLING PULSE

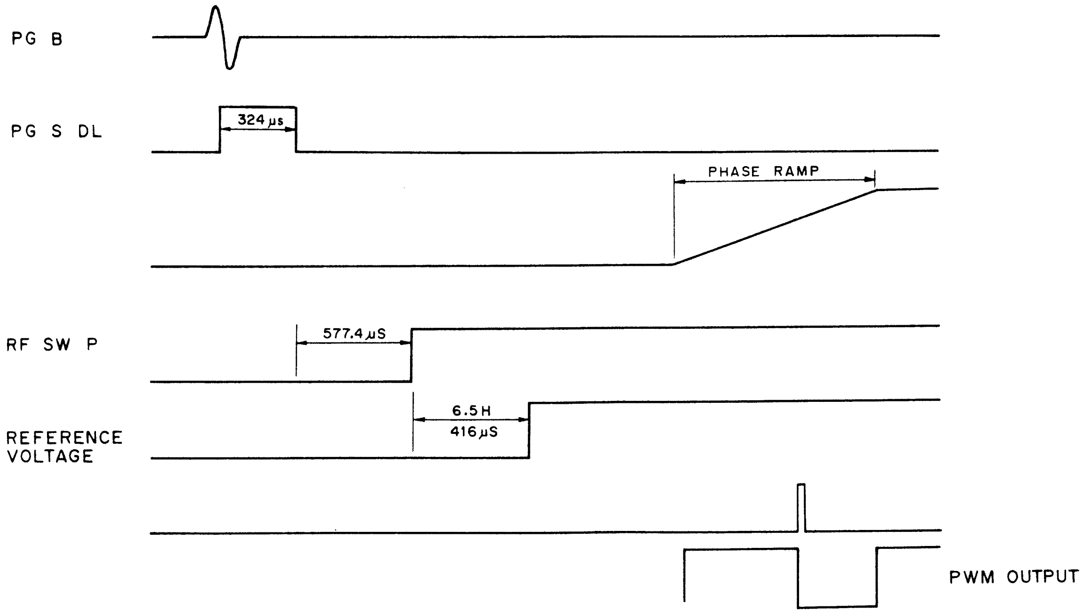
FG CIRCUIT TIMING CHART


90°
80mVp-p
2.5VDC
FG A IN
FG B IN
(FG A-90°)
2.5VDC
IC408 ①
FG A OUT
IC408 ⑤
FG B OUT
FWD
IC410 ⑩
IC410 ⑪
IC401 ⑰
FG A
IC401 ⑱
FG B
IC408 ①
FG A OUT
IC408 ⑤
FG B OUT
RVS
IC401 ⑰
FG A
IC401 ⑱
FG B

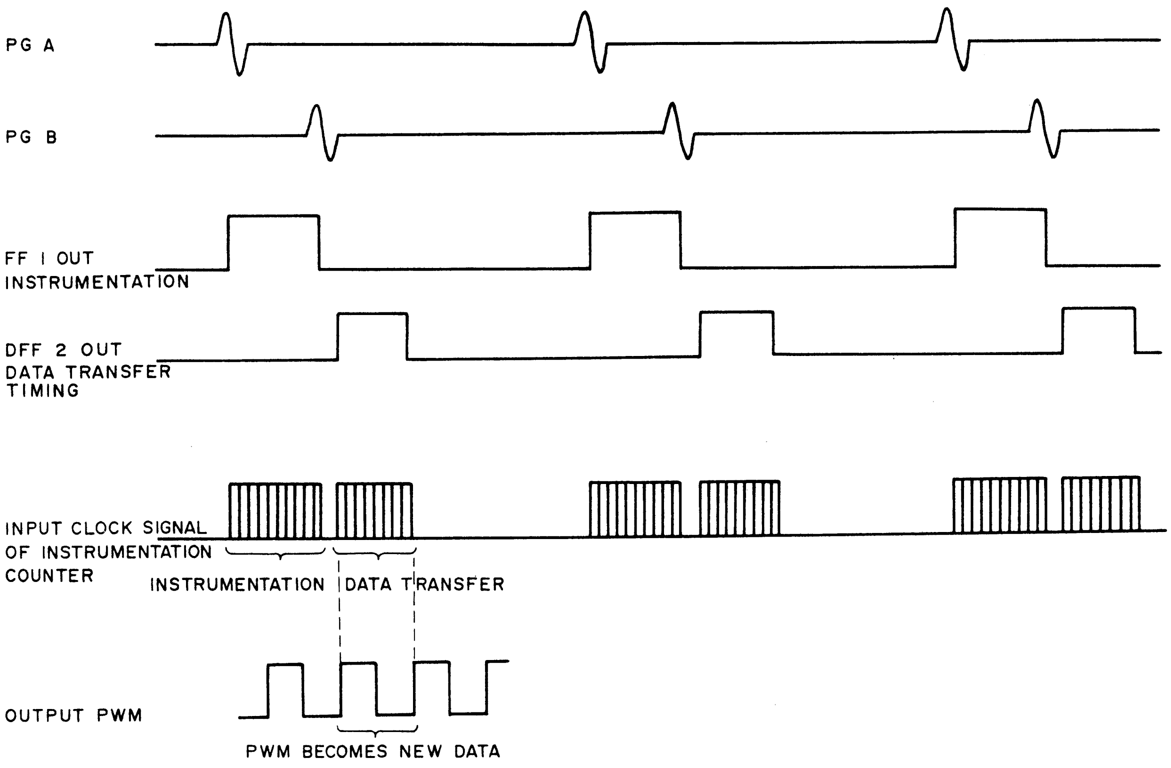
PG-A, PG-B, PG-S TIMING CHART


PG A
30°
SPEED SYSTEM
6 CYCLES/REVOLUTION
PG S
PG B
PHASE SYSTEM
1 CYCLE/REVOLUTION
RF SW P
PG A
PG B

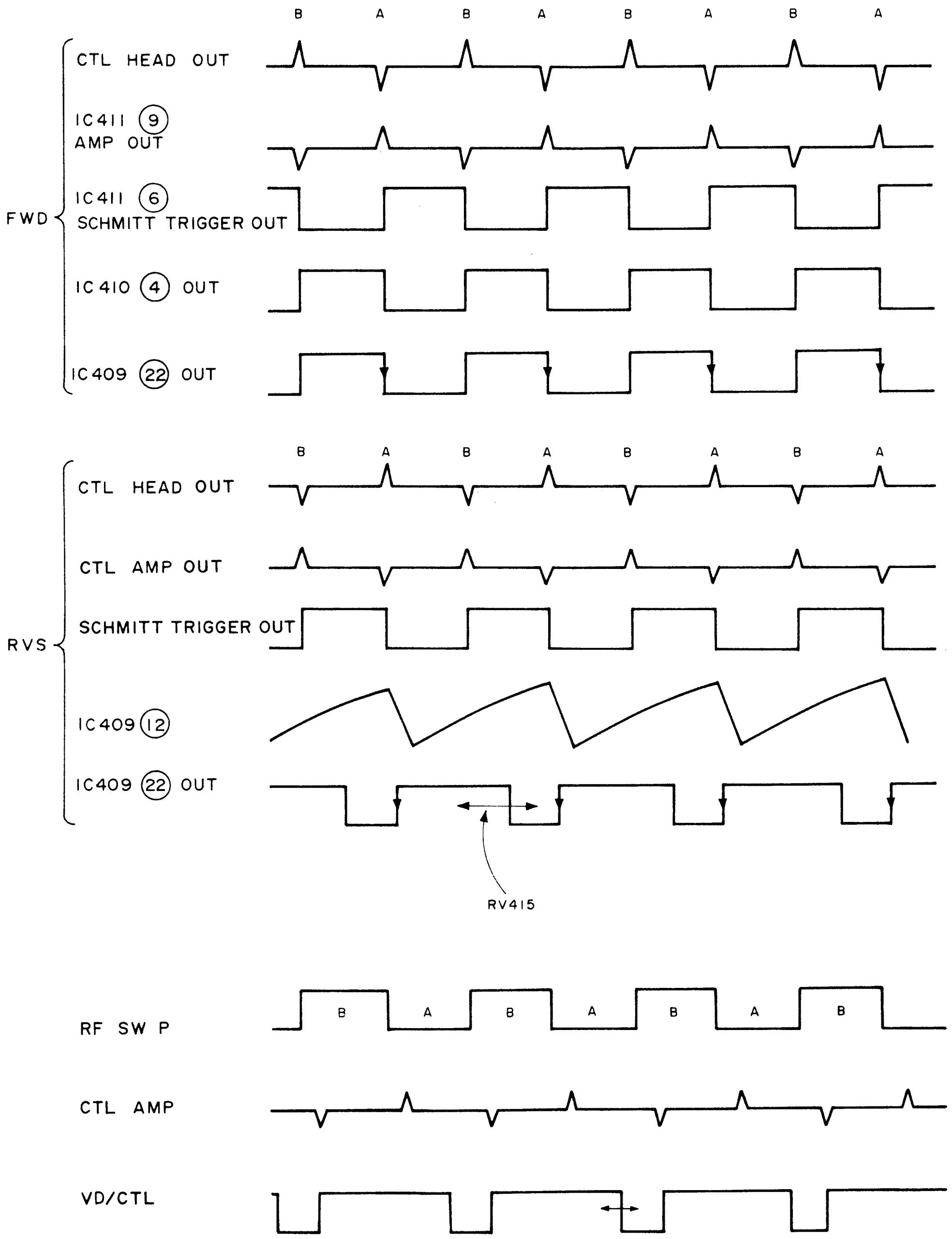
PG-A, PG-S TIMING CHART (RECORDING MODE & PLAYBACK MODE)


PG B
PG S DL
324μs
PHASE RAMP
RF SW P
577.4μS
REFERENCE VOLTAGE
6.5H
416μS
PWM OUTPUT

SERVO AMP TIMING CHART


PG A
PG B
FF I OUT
INSTRUMENTATION
DFF 2 OUT
DATA TRANSFER
TIMING
INPUT CLOCK SIGNAL
OF INSTRUMENTATION
COUNTER
INSTRUMENTATION
DATA TRANSFER
OUTPUT PWM
PWM BECOMES NEW DATA

CTL CIRCUIT OF IC409 TIMING CHART


B A B A B A B A
FWD
CTL HEAD OUT
IC411 ⑨ AMP OUT
IC411 ⑥ SCHMITT TRIGGER OUT
IC410 ④ OUT
IC409 ㉒ OUT
B A B A B A B A
RVS
CTL HEAD OUT
CTL AMP OUT
SCHMITT TRIGGER OUT
IC409 ⑫
IC409 ㉒ OUT
RV415
RF SW P
B A B A B A B
CTL AMP
VD/CTL

VARIABLE SPEED PLAYBACK CIRCUIT TIMING CHART
CHART-1

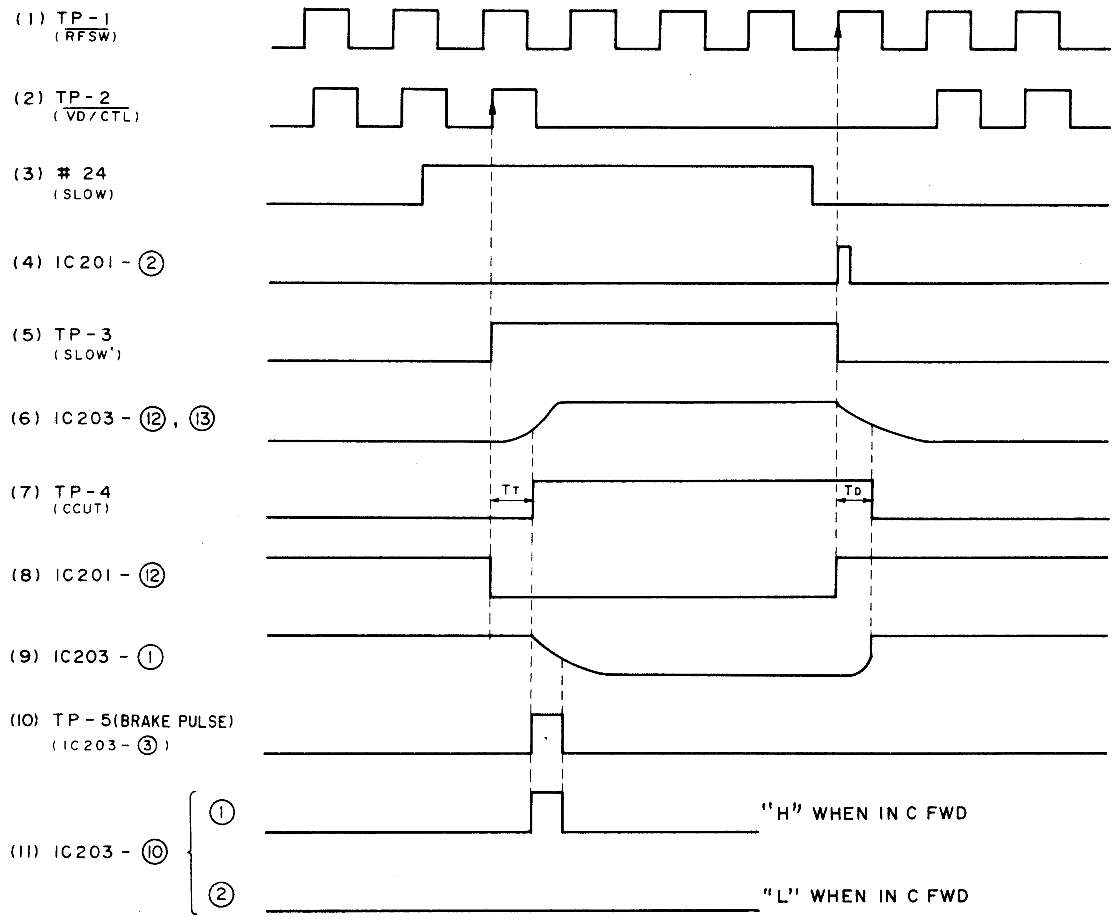
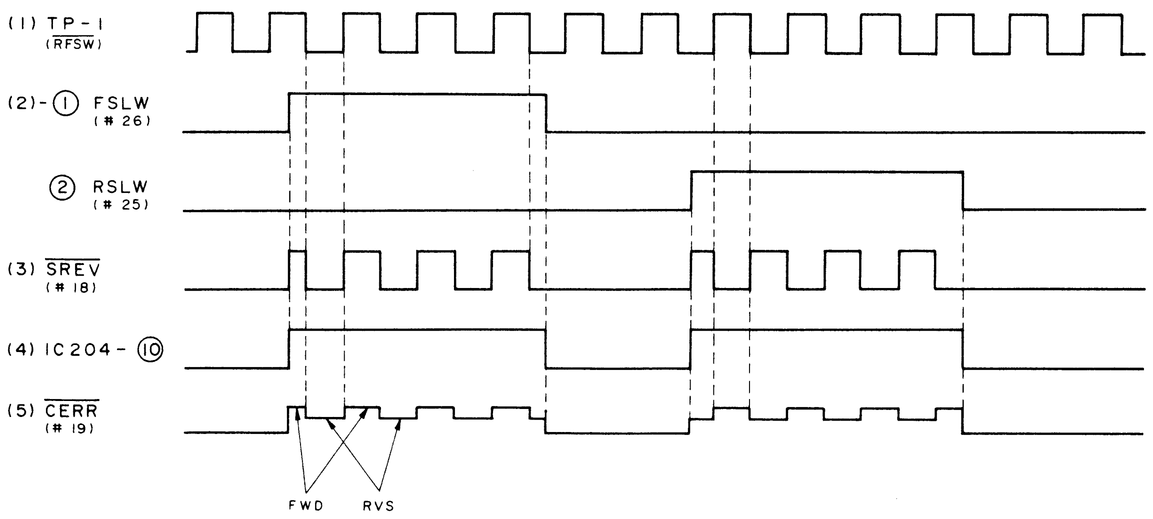
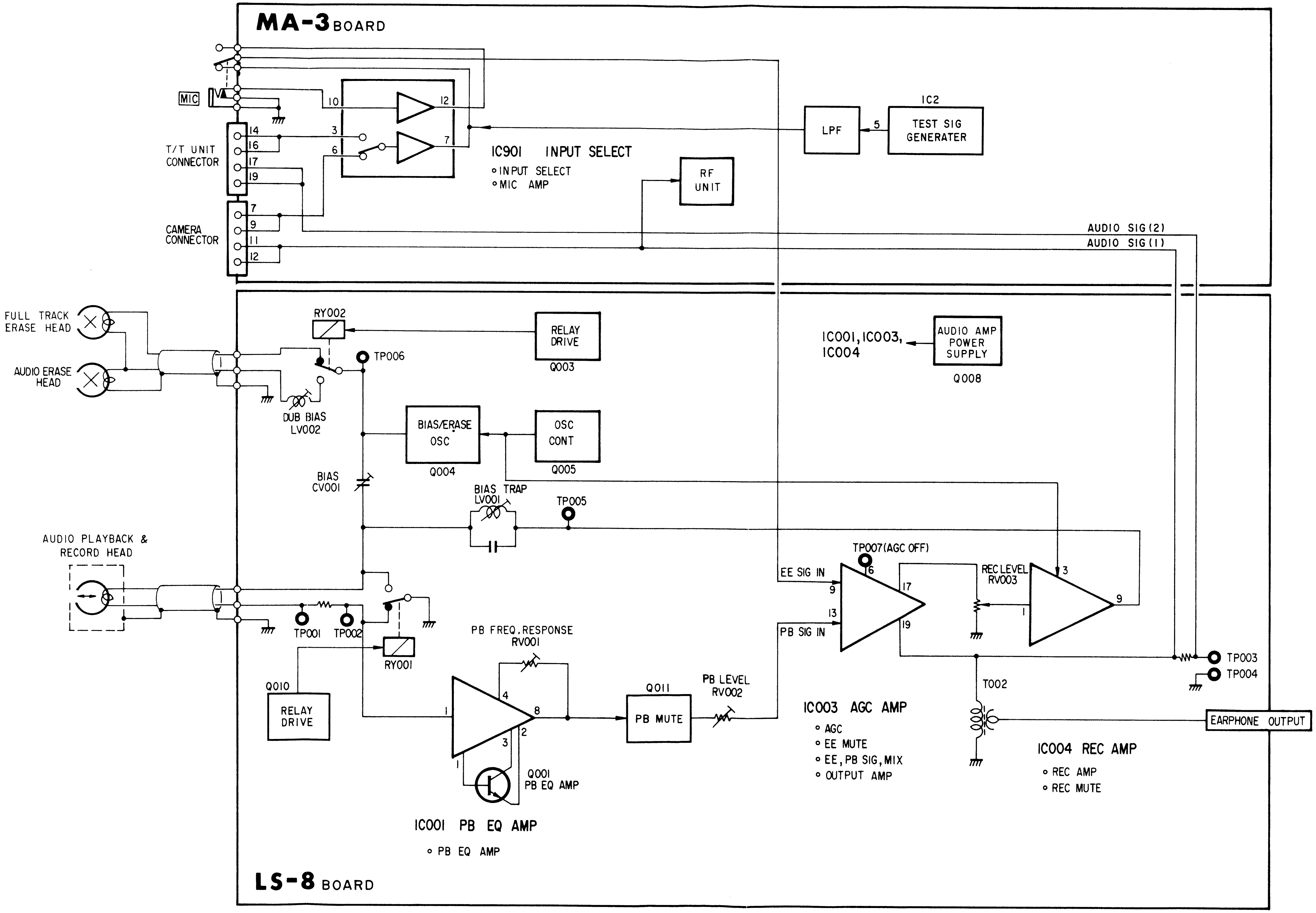

(1) TP-1 (RFSW)
(2) TP-2 (VD/CTL)
(3) # 24 (SLOW)
(4) IC201 - ②
(5) TP-3 (SLOW')
(6) IC203 - ⑫, ⑬
(7) TP-4 (CCUT)
TT
TD
(8) IC201 - ⑫
(9) IC203 - ①
(10) TP-5(BRAKE PULSE) (IC203-③)
(11) IC203 - ⑩
①
"H" WHEN IN C FWD
②
"L" WHEN IN C FWD

CHART-2

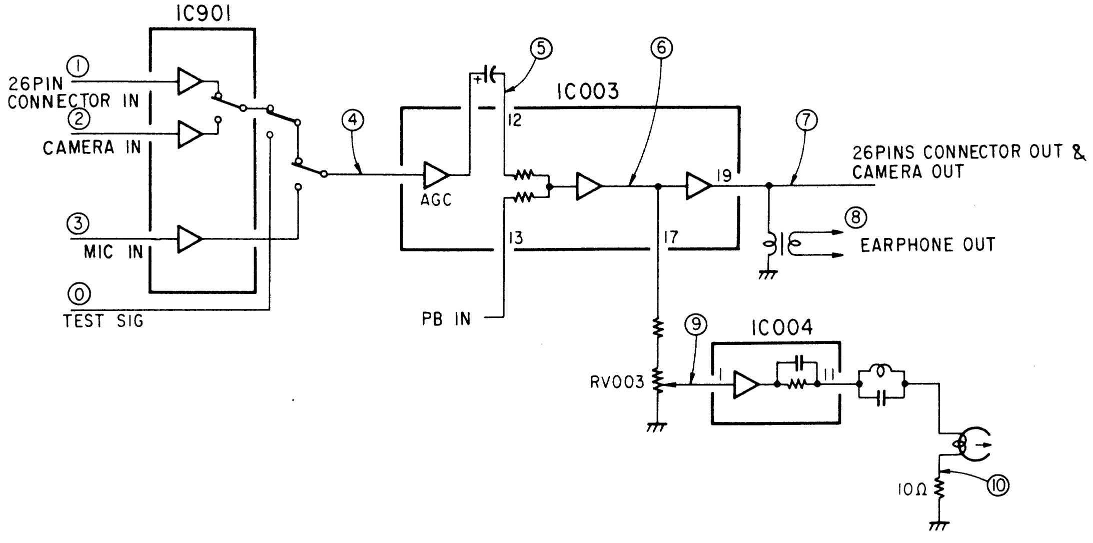

(1) TP-1 (RFSW)
(2)-① FSLW (# 26)
② RSLW (# 25)
(3) SREV (# 18)
(4) IC204- ⑩
(5) CERR (# 19)
FWD
RVS

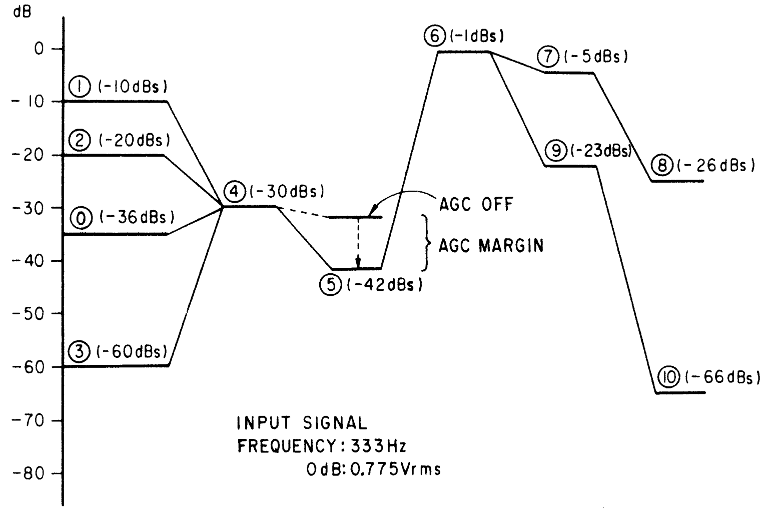
AUDIO CIRCUIT BLOCK DIAGRAM



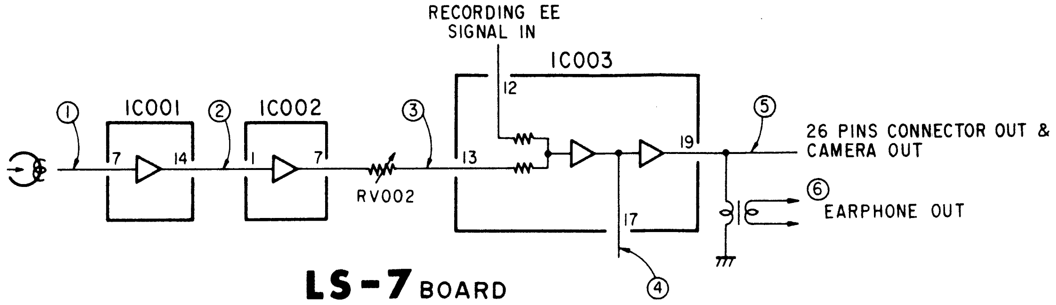
MA-3 BOARD
MIC
T/T UNIT CONNECTOR
14
16
17
19
CAMERA CONNECTOR
7
9
11
12
10
12
3
6
7
IC901 INPUT SELECT
○ INPUT SELECT
○ MIC AMP
RF UNIT
LPF
5
IC2
TEST SIG GENERATER
AUDIO SIG (2)
AUDIO SIG (1)
FULL TRACK ERASE HEAD
AUDIO ERASE HEAD
RY002
TP006
RELAY DRIVE
Q003
DUB BIAS LV002
BIAS/ERASE OSC
Q004
OSC CONT
Q005
BIAS CV001
BIAS TRAP LV001
TP005
IC001, IC003, IC004
AUDIO AMP POWER SUPPLY
Q008
AUDIO PLAYBACK & RECORD HEAD
TP001
TP002
RY001
Q010
RELAY DRIVE
PB FREQ. RESPONSE RV001
1
4
8
2
3
1
Q001 PB EQ AMP
IC001 PB EQ AMP
○ PB EQ AMP
Q011
PB MUTE
PB LEVEL RV002
EE SIG IN
PB SIG IN
TP007 (AGC OFF)
16
9
13
17
19
REC LEVEL RV003
3
1
9
IC003 AGC AMP
○ AGC
○ EE MUTE
○ EE, PB SIG, MIX
○ OUTPUT AMP
T002
IC004 REC AMP
○ REC AMP
○ REC MUTE
TP003
TP004
EARPHONE OUTPUT
LS-8 BOARD

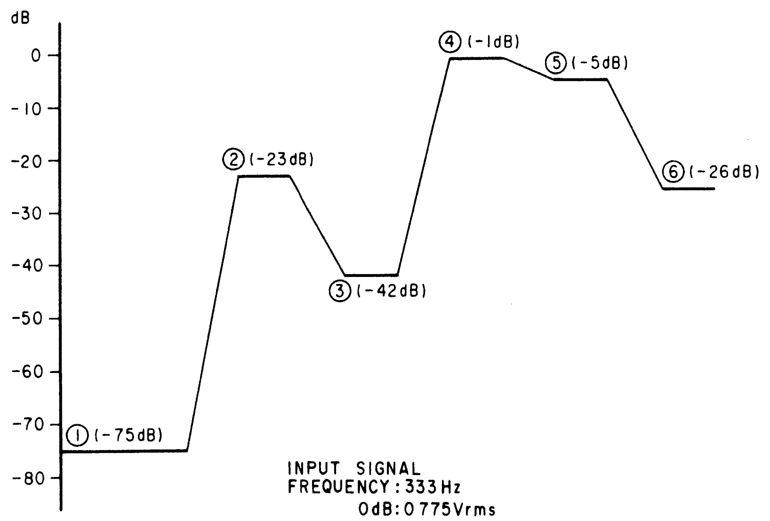
AUDIO LEVEL DIAGRAM
RECORD AMP


IC901
①
26PIN CONNECTOR IN
②
CAMERA IN
③
MIC IN
⓪
TEST SIG
④
⑤
⑥
IC003
AGC
12
13
PB IN
19
17
⑦
26PINS CONNECTOR OUT & CAMERA OUT
⑧
EARPHONE OUT
⑨
IC004
RV003
1
11
10Ω
⑩

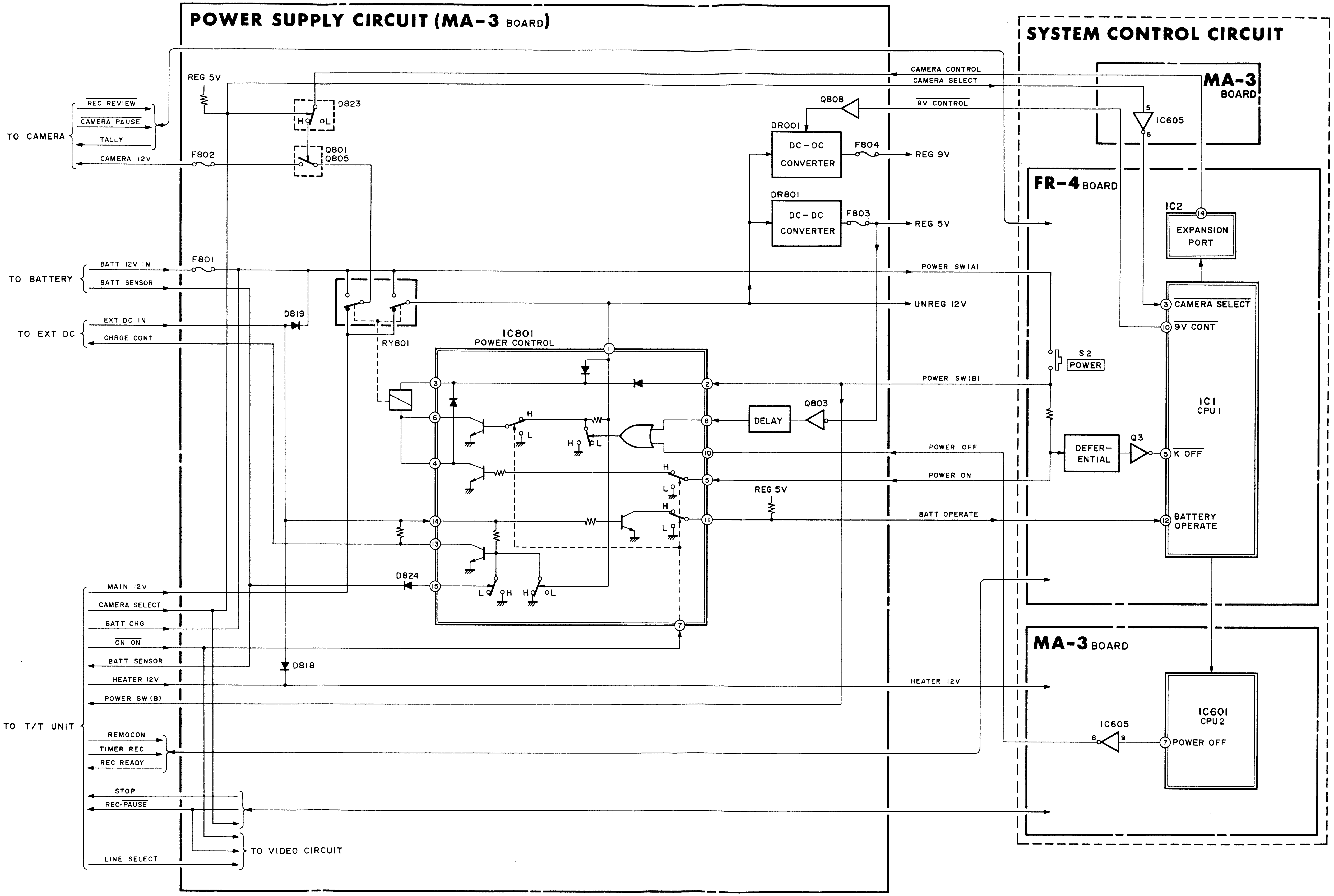


PLAYBACK AMP


RECORDING EE SIGNAL IN
IC003
①
IC001
②
IC002
③
7
14
1
7
RV002
13
12
19
17
④
⑤
26 PINS CONNECTOR OUT & CAMERA OUT
⑥
EARPHONE OUT
LS-7 BOARD



POWER SUPPLY BLOCK DIAGRAM

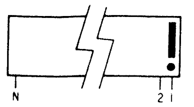


POWER SUPPLY CIRCUIT (MA-3 BOARD)
SYSTEM CONTROL CIRCUIT
MA-3 BOARD
FR-4 BOARD
MA-3 BOARD
TO CAMERA
REC REVIEW
CAMERA PAUSE
TALLY
CAMERA 12V
TO BATTERY
BATT 12V IN
BATT SENSOR
TO EXT DC
EXT DC IN
CHRGE CONT
TO T/T UNIT
MAIN 12V
CAMERA SELECT
BATT CHG
CN ON
BATT SENSOR
HEATER 12V
POWER SW (B)
REMOCON
TIMER REC
REC READY
STOP
REC·PAUSE
LINE SELECT
TO VIDEO CIRCUIT
REG 5V
F802
F801
D823
Q801
Q805
D819
RY801
IC801
POWER CONTROL
D824
D818
Q808
DR001
DC-DC CONVERTER
F804
REG 9V
DR801
DC-DC CONVERTER
F803
REG 5V
POWER SW (A)
UNREG 12V
DELAY
Q803
REG 5V
CAMERA CONTROL
CAMERA SELECT
9V CONTROL
POWER SW (B)
POWER OFF
POWER ON
BATT OPERATE
HEATER 12V
IC605
IC2
EXPANSION PORT
CAMERA SELECT
9V CONT
S2
POWER
IC1
CPU1
DEFER-ENTIAL
Q3
K OFF
BATTERY OPERATE
IC601
CPU2
IC605
POWER OFF
H
L

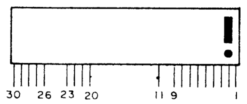
SECTION 3
PRINTED WIRING BOARD AND SCHEMATIC DIAGRAM

SEMICONDUCTOR

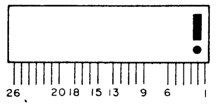
BX-1013 **BX-3971**
BX-1022 **BX-3976**
BX-1025 **BX-3977**
BX-1036 **BX-3978**
BX-1045 **BX-3982-2**
BX-1047 **BX-3983**



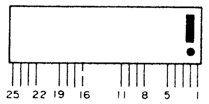
BX-1021


30 26 23 20 11 9 1

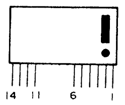
BX-1023


26 20 18 15 13 9 6 1

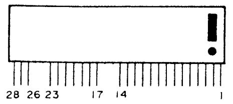
BX-1024


25 22 19 16 11 8 5 1

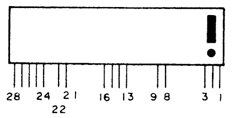
BX-1026



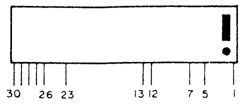
BX-1027


28 26 23 17 14 1

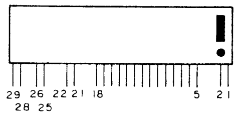
BX-1028


28 24 21 16 13 9 8 3 1
22

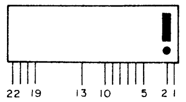
BX-1029


30 26 23 13 12 7 5 1

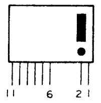
BX-1030


29 26 22 21 18 5 2 1
28 25

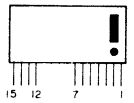
BX-1032


22 19 13 10 5 2 1

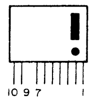
BX-1033



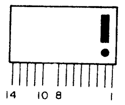
BX-1034



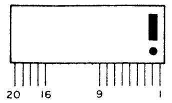
BX-1035
BX-1035A



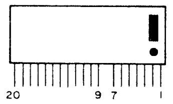
BX-1046



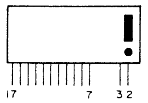
BX-1048
BX-1048A



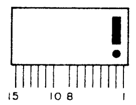
BX-3973



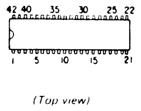
BX-3980



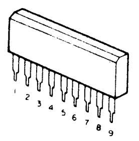
BX-3999
BX-3999-1



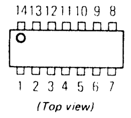
CX-194A


42 40 35 30 25 22
1 5 10 15 21
(Top view)

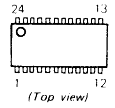
CX-894



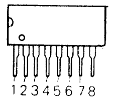
CX-7905A


14 13 12 11 10 9 8
1 2 3 4 5 6 7
(Top view)

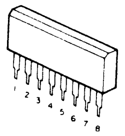
CX-7906


24 13
1 12
(Top view)

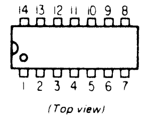
CX-7926



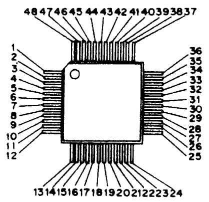
CX-20008



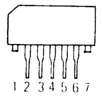
MB8747


14 13 12 11 10 9 8
1 2 3 4 5 6 7
(Top view)

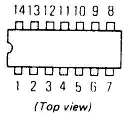
MB8855-139
MB8855-140
MB8855-161


48 47 46 45 44 43 42 41 40 39 38 37
1 2 3 4 5 6 7 8 9 10 11 12
36 35 34 33 32 31 30 29 28 27 26 25
13 14 15 16 17 18 19 20 21 22 23 24

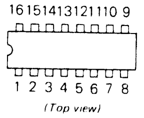
TA7060AP



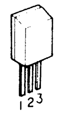
TC40H004P **TC4069UBP**
TC4001BP **TC4081BP**
TC4013BP **μPC324C**
TC4030BP **μPC339C**


14 13 12 11 10 9 8
1 2 3 4 5 6 7
(Top view)

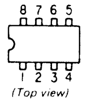
TC4051BP
TC4052BP
TC4053BP
TL494CN


16 15 14 13 12 11 10 9
1 2 3 4 5 6 7 8
(Top view)

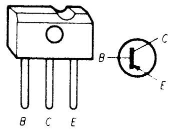
μPC78L05A



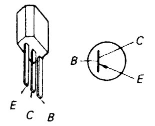
μPC393C


8 7 6 5
1 2 3 4
(Top view)

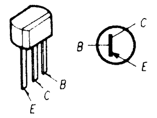
2SA881



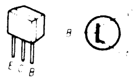
2SA1027R



2SA1115



2SA1175



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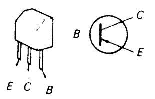

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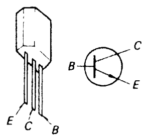

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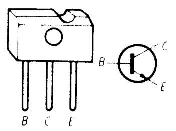
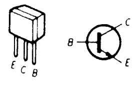
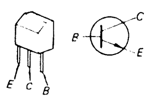
2SC2673



2SC2785



2SD773



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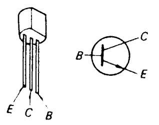

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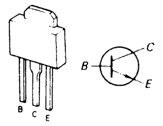
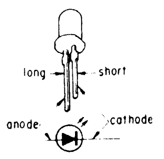
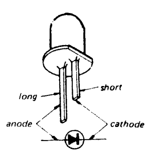


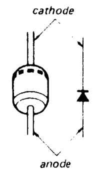
BR3402S


long
short
anode
cathode

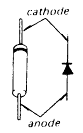
AA3432S
AY3432S
PG3432SY


long
short
anode
cathode

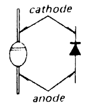
ERB81-004


cathode
anode

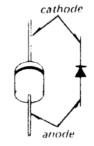
EQA0206AB5 **RD13E-B**
RD2.7E-B **RD18E-B**
RD3.0E-B **RD22E-B**
RD3.6E-B **1SS106**
RD6.2E-B **1SS119**
RD9.1E-B **1SS133**


cathode
anode

U05G
U05E

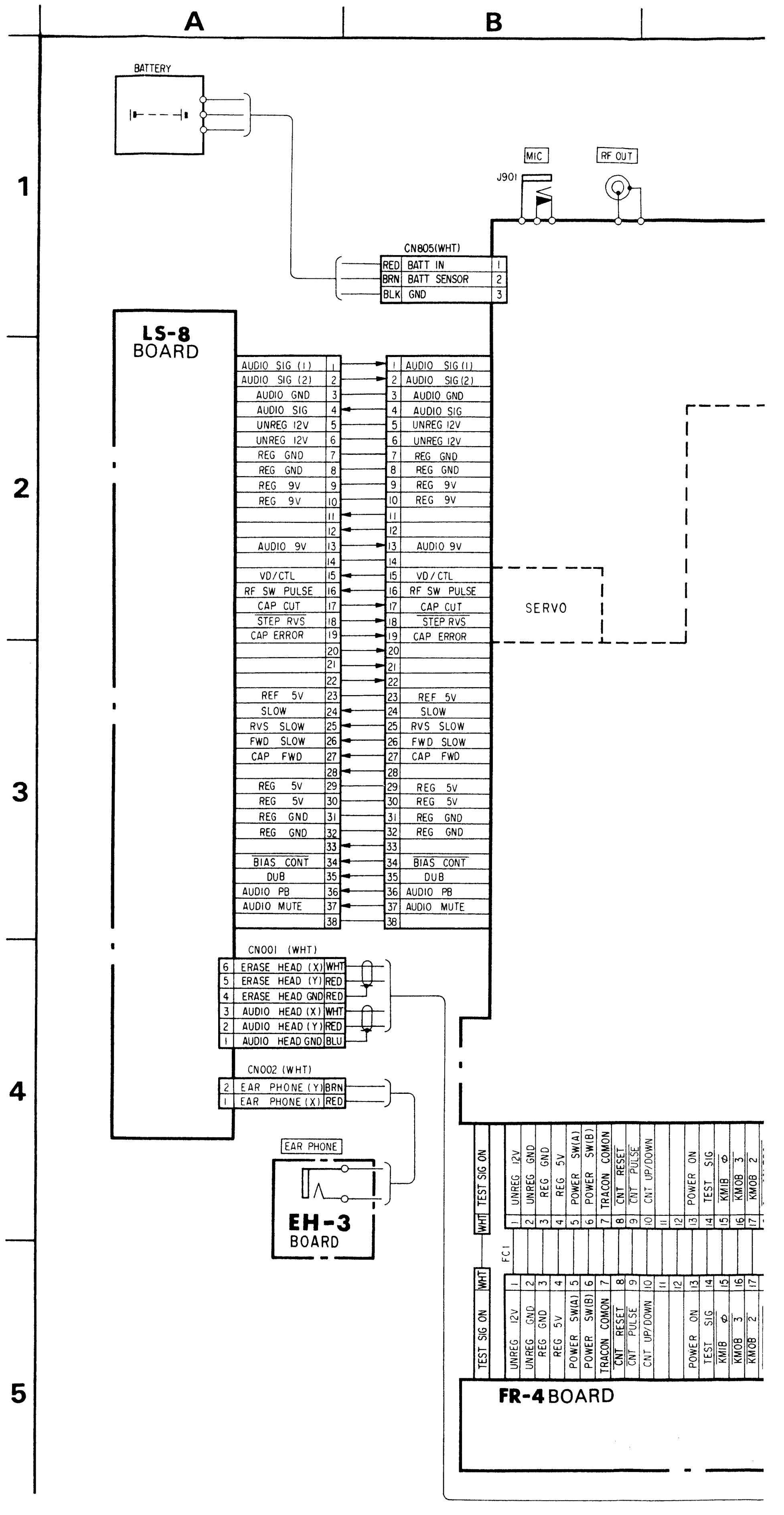

cathode
anode

10E-2

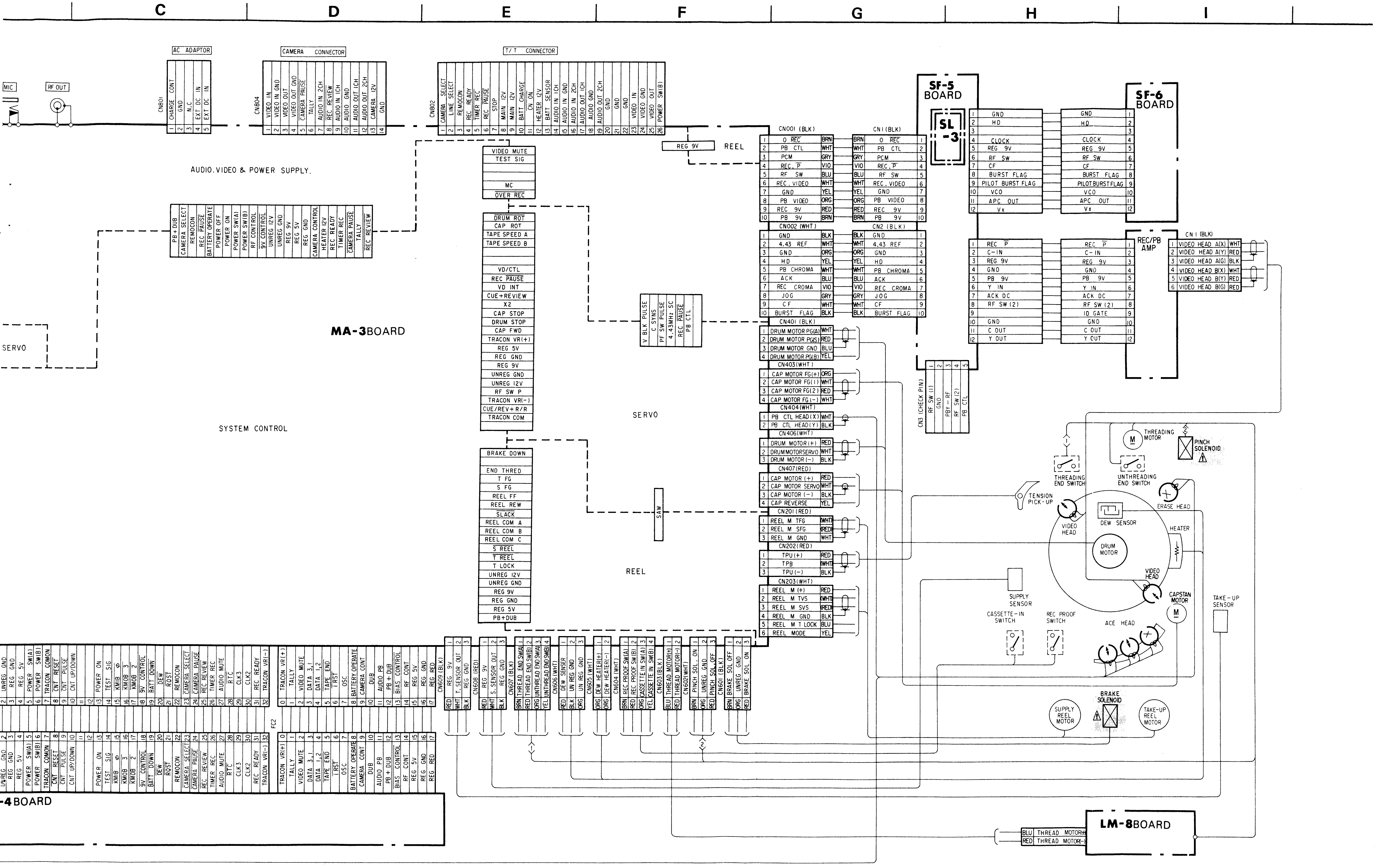

cathode
anode

The components identified by shading and ⚠ mark are critical for safety. Replace only with part number specified.

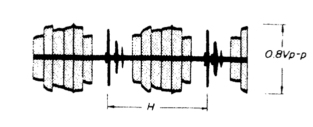
FRAME SCHEMATIC DIAGRAM


A
B
1
2
3
4
5
BATTERY
MIC
RF OUT
J901
CN805(WHT)
RED BATT IN 1
BRN BATT SENSOR 2
BLK GND 3
LS-8 BOARD
AUDIO SIG (1)
AUDIO SIG (2)
AUDIO GND
AUDIO SIG
UNREG 12V
UNREG 12V
REG GND
REG GND
REG 9V
REG 9V
AUDIO 9V
VD/CTL
RF SW PULSE
CAP CUT
STEP RVS
CAP ERROR
REF 5V
SLOW
RVS SLOW
FWD SLOW
CAP FWD
REG 5V
REG 5V
REG GND
REG GND
BIAS CONT
DUB
AUDIO PB
AUDIO MUTE
SERVO
CN001 (WHT)
6 ERASE HEAD (X) WHT
5 ERASE HEAD (Y) RED
4 ERASE HEAD GND RED
3 AUDIO HEAD (X) WHT
2 AUDIO HEAD (Y) RED
1 AUDIO HEAD GND BLU
CN002 (WHT)
2 EAR PHONE (Y) BRN
1 EAR PHONE (X) RED
EAR PHONE
EH-3 BOARD
WHT TEST SIG ON
UNREG 12V
UNREG GND
REG GND
REG 5V
POWER SW(A)
POWER SW(B)
TRACON COMON
CNT RESET
CNT PULSE
CNT UP/DOWN
POWER ON
TEST SIG
KMIB Φ
KMOB 3
KMOB 2
FC1
FR-4 BOARD

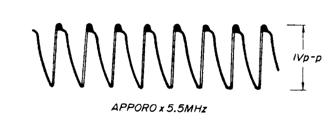
FRAME FRAME


C
D
E
F
G
H
I
MIC
RF OUT
AC ADAPTOR
CN801
CHARGE CONT
GND
N.C
EXT DC IN
EXT DC IN
CAMERA CONNECTOR
CN804
VIDEO IN
VIDEO IN GND
VIDEO OUT
VIDEO OUT GND
CAMERA PAUSE
TALLY
AUDIO IN 2CH
REC REVIEW
AUDIO IN 1CH
AUDIO GND
AUDIO OUT 1CH
AUDIO OUT 2CH
CAMERA 12V
GND
T/T CONNECTOR
CN802
CAMERA SELECT
LINE SELECT
REMOCON
REC READY
TIMER REC
REC PAUSE
STOP
MAIN 12V
MAIN 12V
BATT CHARGE
CN ON
HEATER 12V
BATT SENSOR
AUDIO IN 1CH
AUDIO IN 2CH
AUDIO IN 2CH
AUDIO GND
AUDIO OUT 2CH
GND
GND
GND
VIDEO IN
VIDEO GND
VIDEO OUT
POWER SW(B)
AUDIO, VIDEO & POWER SUPPLY
PB+DUB
CAMERA SELECT
REMOCON
REC PAUSE
BATTERY OPERATE
POWER OFF
POWER ON
POWER SW(A)
POWER SW(B)
RF CONTROL
9V CONTROL
UNREG 12V
UNREG GND
REG 9V
REG 5V
REG GND
CAMERA CONTROL
HEATER 12V
REC READY
TIMER REC
CAMERA PAUSE
TALLY
REC REVIEW
VIDEO MUTE
TEST SIG
MC
OVER REC
DRUM ROT
CAP ROT
TAPE SPEED A
TAPE SPEED B
VD/CTL
REC PAUSE
VD INT
CUE+REVIEW
X2
CAP STOP
DRUM STOP
TRACON VR(+)
CAP FWD
REG 5V
REG GND
REG 9V
UNREG GND
UNREG 12V
RF SW P
TRACON VR(−)
CUE/REV+R/R
TRACON COM
MA-3BOARD
SERVO
SYSTEM CONTROL
BRAKE DOWN
END THRED
T FG
S FG
REEL FF
REEL REW
SLACK
REEL COM A
REEL COM B
REEL COM C
S REEL
T REEL
T LOCK
UNREG 12V
UNREG GND
REG 9V
REG GND
REG 5V
PB+DUB
V BLK PULSE
C SYNC
PF SW PULSE
4.43MHz SC
REC PAUSE
PB CTL
SERVO
SAW
REEL
REG 9V
REEL
CN001 (BLK)
O REC
PB CTL
PCM
REC P
RF SW
REC VIDEO
GND
PB VIDEO
REC 9V
PB 9V
BRN
WHT
GRY
VIO
BLU
WHT
YEL
ORG
RED
BRN
CN1 (BLK)
CN002 (WHT)
GND
4.43 REF
GND
HD
PB CHROMA
ACK
REC CROMA
JOG
CF
BURST FLAG
BLK
WHT
ORG
YEL
WHT
BLU
VIO
GRY
WHT
BLK
CN2 (BLK)
CN401 (BLK)
DRUM MOTOR PG(A)
DRUM MOTOR PG(S)
DRUM MOTOR GND
DRUM MOTOR PG(B)
CN403 (WHT)
CAP MOTOR FG(+)
CAP MOTOR FG(1)
CAP MOTOR FG(2)
CAP MOTOR FG(−)
CN404 (WHT)
PB CTL HEAD(X)
PB CTL HEAD(Y)
CN406 (WHT)
DRUM MOTOR(+)
DRUM MOTOR SERVO
DRUM MOTOR(−)
CN407 (RED)
CAP MOTOR (+)
CAP MOTOR SERVO
CAP MOTOR (−)
CAP REVERSE
CN201 (RED)
REEL M TFG
REEL M SFG
REEL M GND
CN202 (RED)
TPU(+)
TPB
TPU(−)
CN203 (WHT)
REEL M (+)
REEL M TVS
REEL M SVS
REEL M GND
REEL M T LOCK
REEL MODE
SF-5 BOARD
SL-3
SF-6 BOARD
GND
HD
CLOCK
REG 9V
RF SW
CF
BURST FLAG
PILOT BURST FLAG
VCO
APC OUT
Vx
REC P
C-IN
REG 9V
GND
PB 9V
Y IN
ACK DC
RF SW (2)
ID GATE
GND
C OUT
Y OUT
REC/PB AMP
CN1 (BLK)
VIDEO HEAD A(X)
VIDEO HEAD A(Y)
VIDEO HEAD A(G)
VIDEO HEAD B(X)
VIDEO HEAD B(Y)
VIDEO HEAD B(G)
CN3 (CHECK PIN)
RF SW (1)
GND
PBY-RF
RF SW (2)
PB CTL
THREADING MOTOR
PINCH SOLENOID
THREADING END SWITCH
UNTHREADING END SWITCH
TENSION PICK-UP
DEW SENSOR
ERASE HEAD
VIDEO HEAD
DRUM MOTOR
HEATER
VIDEO HEAD
CAPSTAN MOTOR
SUPPLY SENSOR
TAKE-UP SENSOR
CASSETTE-IN SWITCH
REC PROOF SWITCH
ACE HEAD
SUPPLY REEL MOTOR
BRAKE SOLENOID
TAKE-UP REEL MOTOR
CN609 (BLK)
REG 9V
T. SENSOR OUT
REG GND
CN608 (RED)
REG 9V
S. SENSOR OUT
REG GND
CN607 (BLK)
THREAD END SW(A)
THREAD END SW(B)
UNTHREAD END SW(A)
UNTHREAD END SW(B)
CN606 (WHT)
DEW SENSER
UN REG GND
REG GND
CN605 (WHT)
DEW HEATER(+)
DEW HEATER(−)
CN604 (WHT)
REC PROOF SW(A)
REC PROOF SW(B)
CASSETTE IN SW(A)
CASSETTE IN SW(B)
CN603 (BLK)
THREAD MOTOR(+)
THREAD MOTOR(−)
CN602 (WHT)
PINCH SOL. ON
UNREG GND
PINCH SOL. OFF
CN601 (BLK)
BRAKE SOL OFF
UNREG GND
BRAKE SOL ON
UNREG GND
REG GND
REG 5V
POWER SW(A)
POWER SW(B)
TRACON COMON
CNT RESET
CNT PULSE
CNT UP/DOWN
POWER ON
TEST SIG
KMIB φ
KMOB 2
KMOB 3
9V CONTROL
BATT DOWN
DEW
ROST
REMOCON
CAMERA SELECT
CAMERA PAUSE
REC REVIEW
TIMER REC
AUDIO MUTE
RTC
CLK3
CLK2
REC READY
TRACON VR(−)
TRACON VR(+)
TALLY
VIDEO MUTE
DATA 3,1
DATA 1,2
TAPE END
I RST
OSC
BATTERY OPERATE
CAMERA CONT
DUB
AUDIO PB
PB + DUB
BIAS CONTROL
RF CONT
REG 5V
REG GND
REG RED
FC2
-4BOARD
LM-8BOARD
BLU THREAD MOTOR(+)
RED THREAD MOTOR(−)

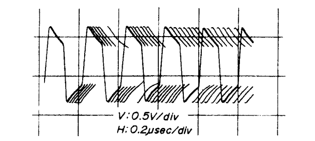
SF-5 BOARD



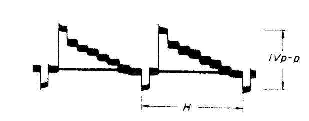
IC1 ⑧ REC



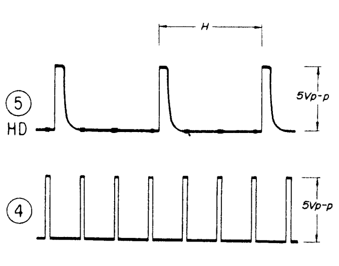
IC7 ① REC/PB



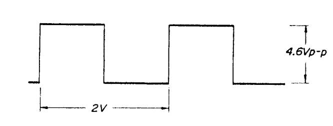
TP-1 REC



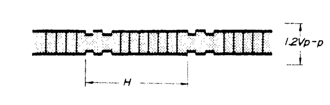
IC4 ③ PB



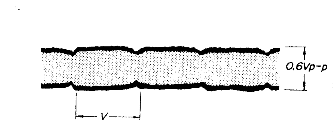
IC7 ⑤, ④ REC/PB



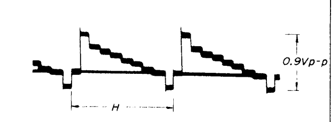
CN1 ⑤ REC/PB RF SW PULSE



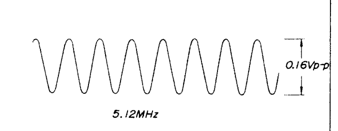
IC4 ⑧ PB



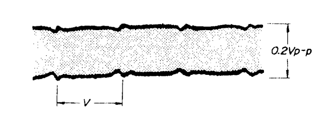
RP AMP ⑪ PB



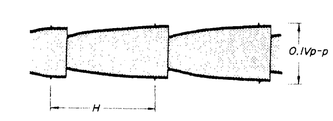
IC4 ⑬ PB



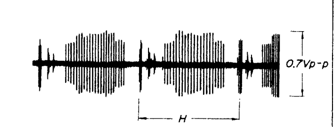
IC7 ⑩ REC/PB



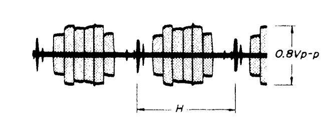
RP AMP ⑫ PB



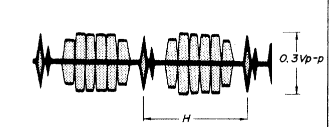
IC4 ⑮ PB



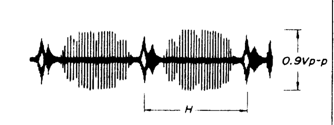
IC7 ⑰ REC



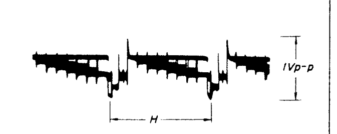
IC5 ① REC



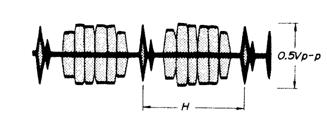
IC7 ㉗ PB



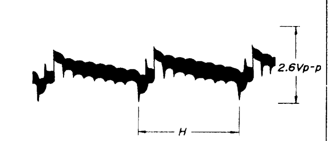
IC5 ① PB



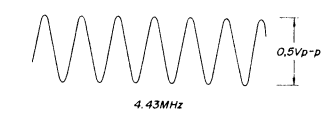
IC8 ⑨ REC



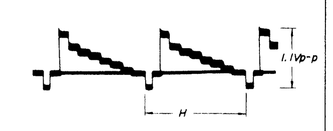
IC5 ⑮ PB



IC9 ⑨ PB

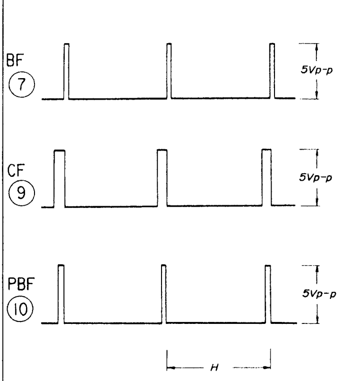


IC6 ⑬ REC/PB

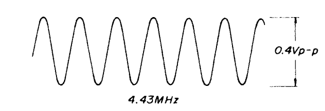


IC10 ⑭ PB

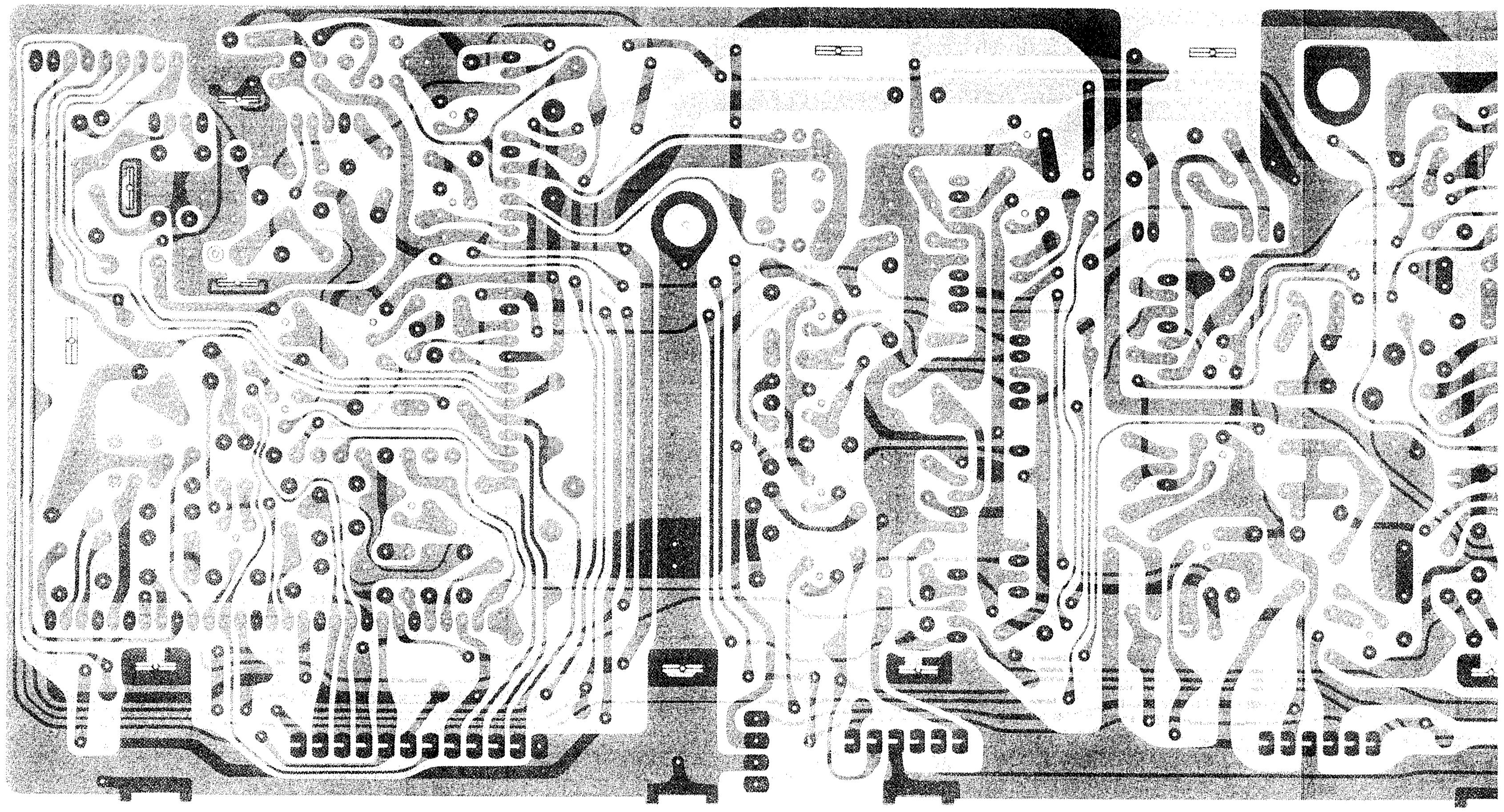
SF-6 BOARD



IC102 ⑦, ⑨, ⑩
REC/PB

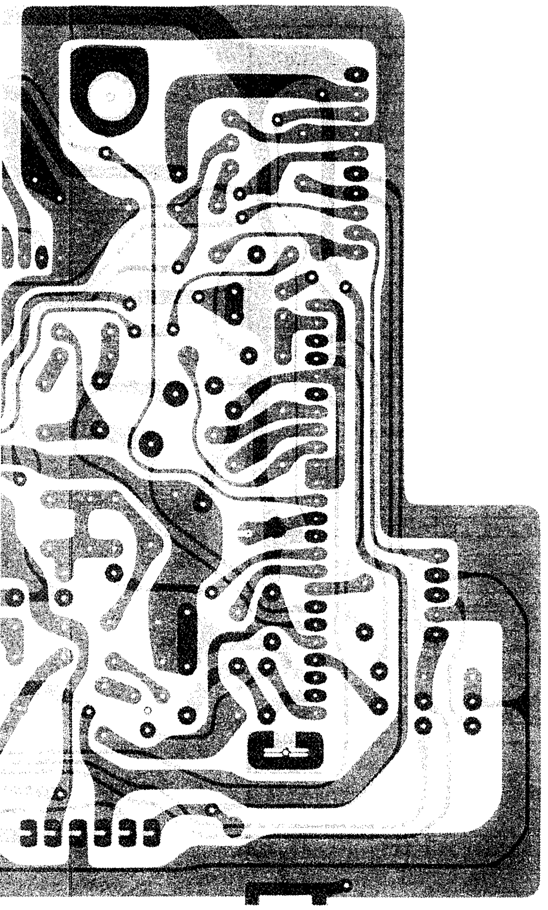


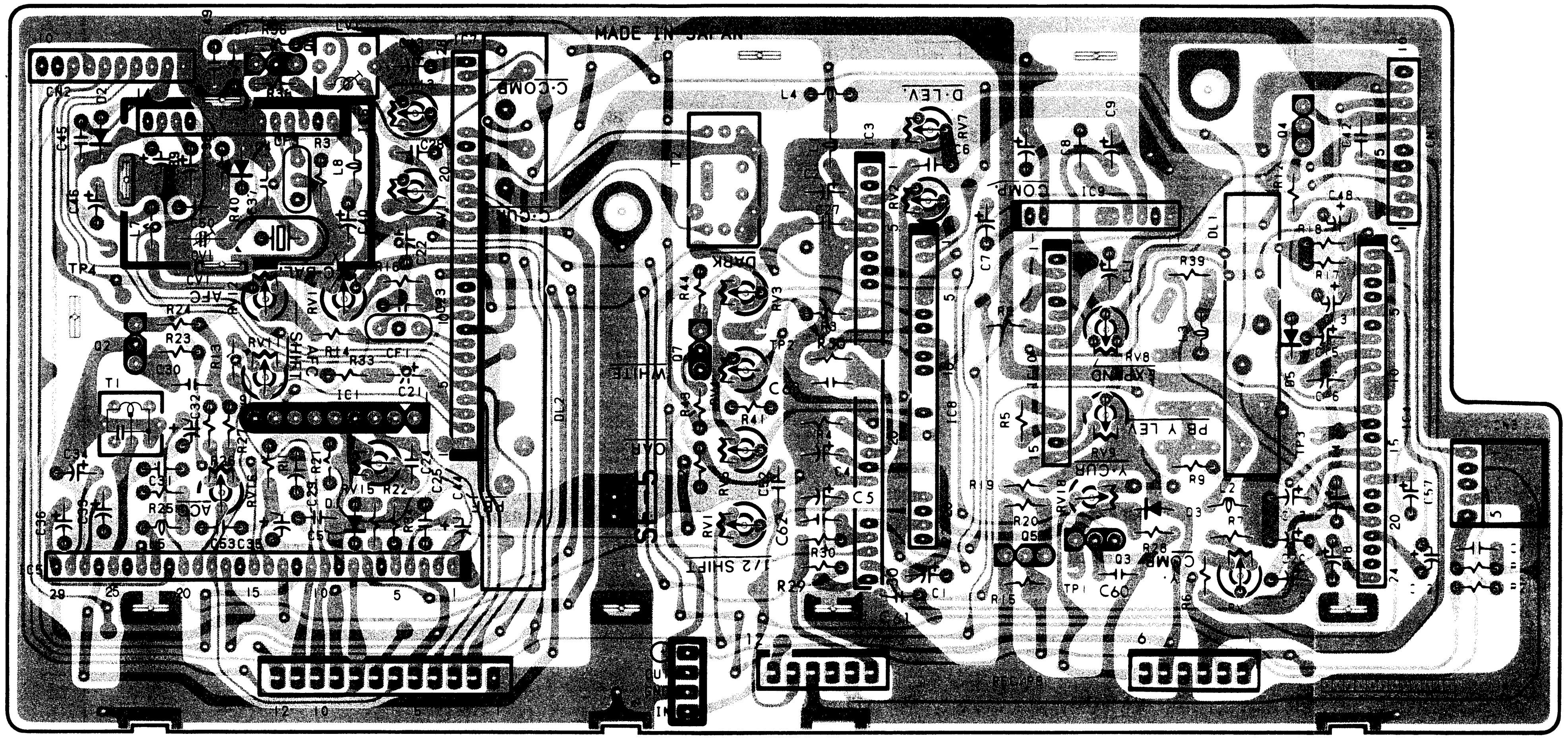
IC103 ⑦ REC/PB



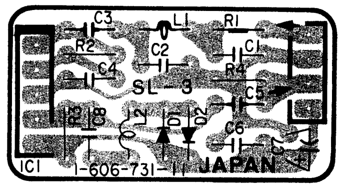
SF-5 BOARD

Q, IC	2 IC6 6 IC5 IC7 7 IC3 IC8 5 IC10 IC9 3 4 IC4	Q, IC
D	2 4 1 3 5	D
ADJ	CV1 RV12 RV16 RV11 LV1 RV13 RV14 RV15 RV17 RV3 RV5 RV4 RV1 RV7 RV2 RV8 RV18 RV9 RV10	ADJ

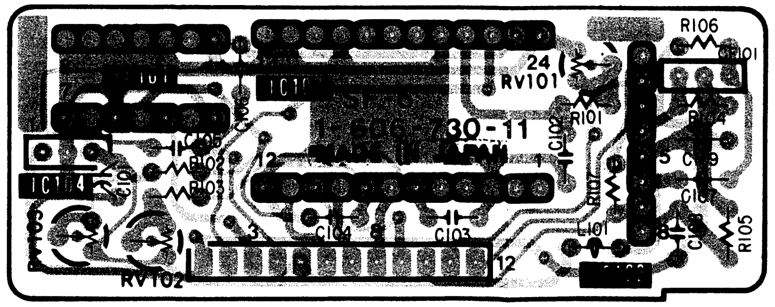


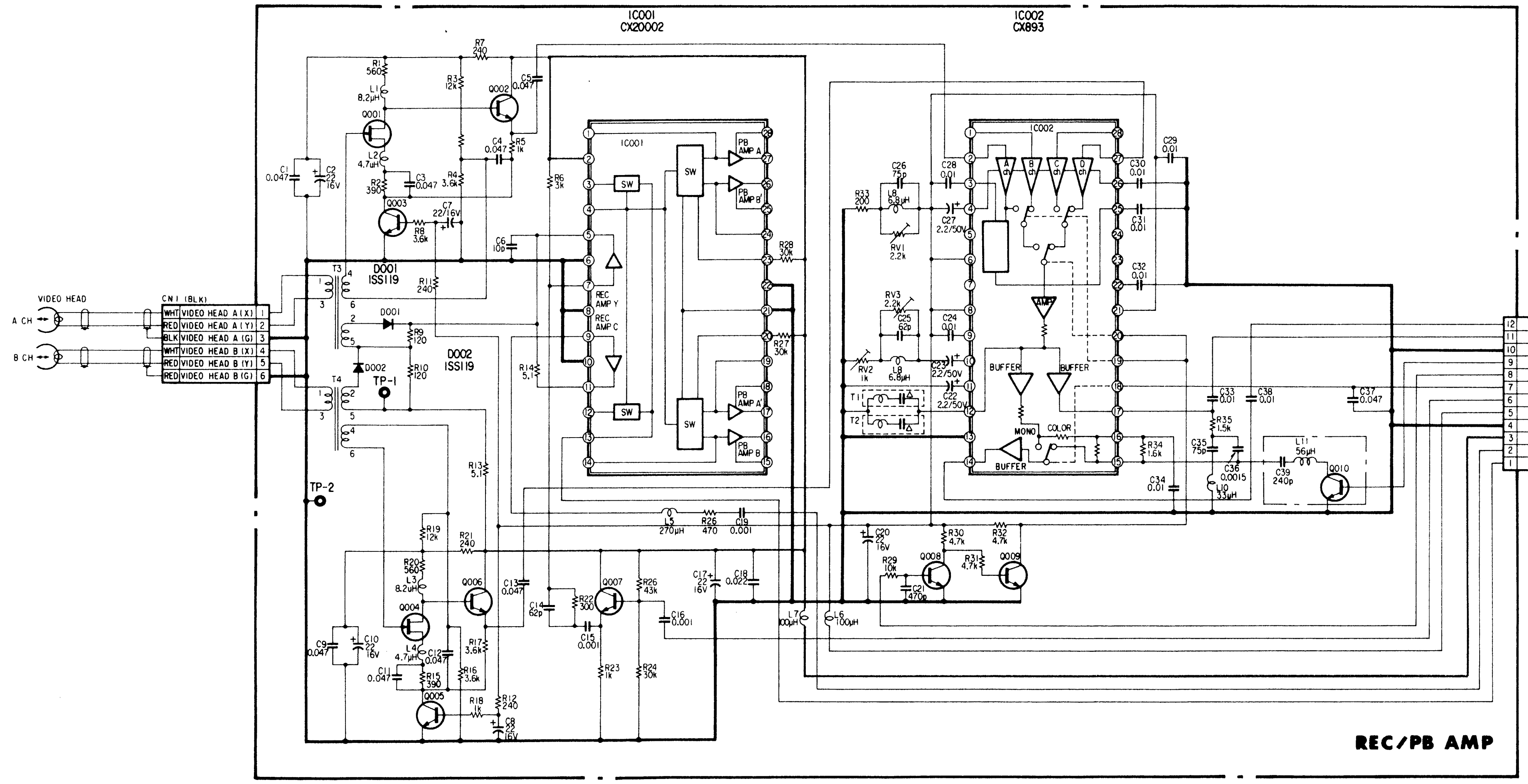

MADE IN JAPAN
CN2
D2
C45
C46
TP4
C-COMB
D.LEV
L4
IC3
RV7
C6
C9
C8
COMP
IC9
DL1
C48
R18
R17
R39
C7
DARK
R44
RV3
WHITE
R41
RV1
C62
C5
1/2 SHIFT
R30
R29
C1
R15
IC6
IC7
DL2
IC1
T1
Q2
R23
R24
C30
C32
CF1
R33
R14
R13
C21
RV15
R22
R21
R25
RV16
AFC
RV11
RV13
R3
L8
C10
C36
C35
C53
RV8
PB Y LEV
Y CUR
RV18
R5
R19
R20
Q5
Q3
R28
TP1
C60
R9
COMB
TP3
C57
R7
L2
C4
CV1
29
25
20
15
10
5
1
12
10
6

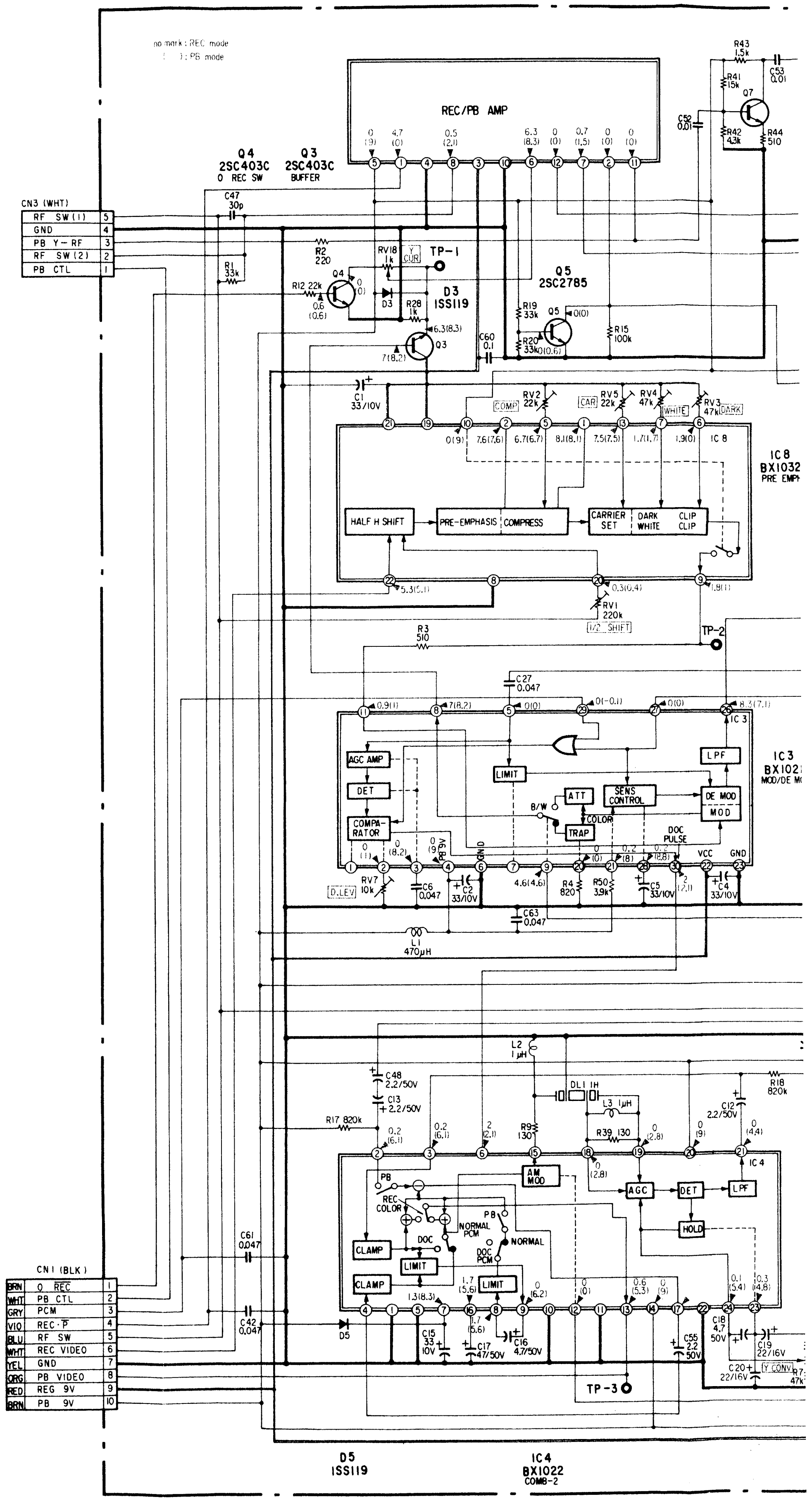
SL-3 BOARD


C3
L1
R1
R2
C2
C1
C4
R4
SL-3
C5
L2
D1
D2
C6
C7
IC1
1-606-731-11 JAPAN

SF-6 BOARD


R106
C101
24
RV101
IC101
R101
1-606-730-11
MADE IN JAPAN
IC102
R102
R103
C104
C103
L101
C105
R107
R105
RV103
RV102
12
1


VIDEO HEAD
A CH
B CH
CN1 (BLK)
VIDEO HEAD A (X)
VIDEO HEAD A (Y)
VIDEO HEAD A (G)
VIDEO HEAD B (X)
VIDEO HEAD B (Y)
VIDEO HEAD B (G)
T3
T4
D001 1SS119
D002 1SS119
TP-1
TP-2
IC001 CX20002
IC002 CX893
Q001
Q002
Q003
Q004
Q005
Q006
Q007
Q008
Q009
Q010
SW
PB AMP A
PB AMP B
PB AMP A'
PB AMP B'
REC AMP Y
REC AMP C
BUFFER
MONO
COLOR
AMP
Y OUT
C OUT
GND
ID GATE
RF SW (2)
ACK DC
Y IN
PB 9V
REG 9V
C IN
REC P
REC/PB AMP


no mark : REC mode
( ) : PB mode
REC/PB AMP
Q4 2SC403C REC SW
Q3 2SC403C BUFFER
Q5 2SC2785
Q7
D3 1SS119
TP-1
TP-2
TP-3
CN3 (WHT)
RF SW (1)
GND
PB Y-RF
RF SW (2)
PB CTL
IC8 BX1032 PRE EMP
HALF H SHIFT
PRE-EMPHASIS COMPRESS
CARRIER SET
DARK WHITE
CLIP CLIP
RV1 220k 1/2 SHIFT
IC3 BX1023 MOD/DE MOD
AGC AMP
DET
COMPA-RATOR
LIMIT
B/W
COLOR
ATT
TRAP
SENS CONTROL
DE MOD
MOD
LPF
DOC PULSE
VCC
GND
L1 470µH
L2 1µH
DL1 1H
L3 1µH
IC4 BX1022 COMB-2
AM MOD
AGC
DET
LPF
HOLD
CLAMP
LIMIT
NORMAL PCM
DOC PCM
NORMAL
PB
REC
CN1 (BLK)
0 REC
PB CTL
PCM
REC·P
RF SW
REC VIDEO
GND
PB VIDEO
REG 9V
PB 9V
D5 1SS119

NOTES:

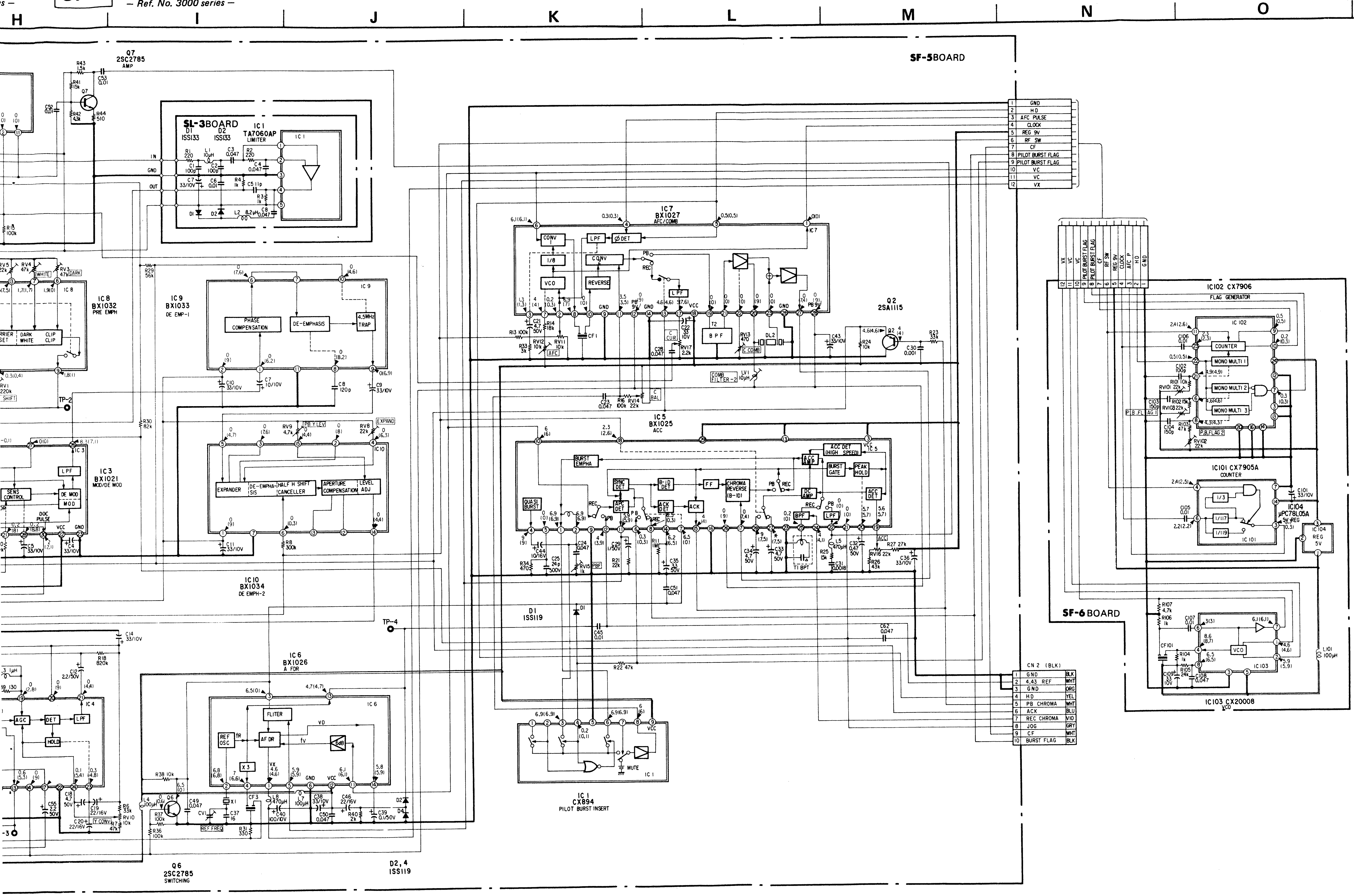
- All resistors are in ohms, 1/8W unless otherwise noted. kΩ = 1000Ω; MΩ = 1000kΩ
- All capacitors are in µF unless otherwise noted. p : µµF 50WV or less are not indicated except for electrolytics.
- All variable and adjustable resistors have characteristic curve B, unless otherwise noted.
- ⊡ : nonflammable resistor.
- The red lines show the main voltages.
- Marked * is not able to measure the voltage of it's position.
- All voltages are dc measured with a DMT (1MΩ/V).

The components identified by shading and ⚠ mark are critical for safety. Replace only with part number specified.

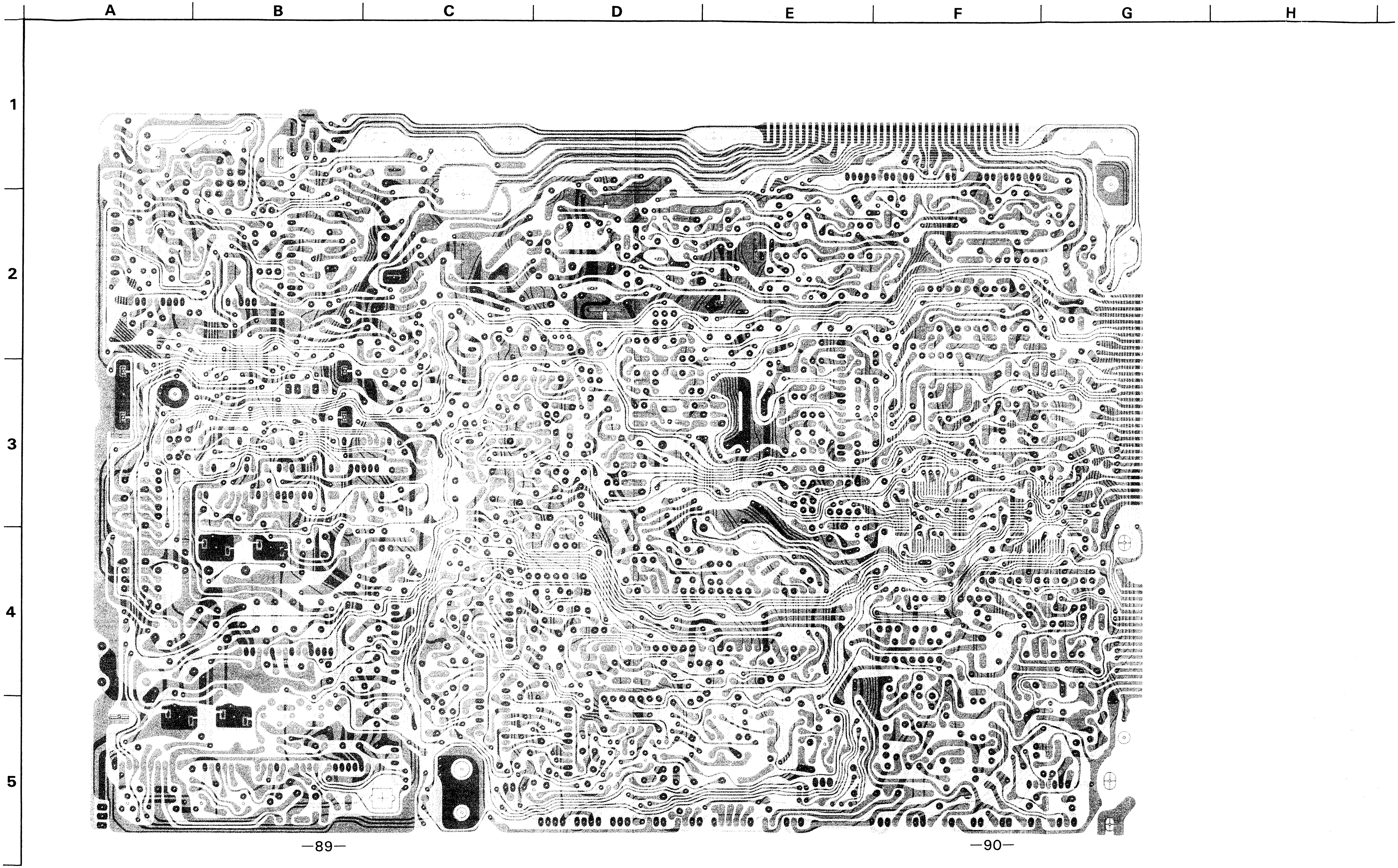
When indicating parts by reference number, please include the board name.

SF-6 (VIDEO PROCESS)
– Ref. No. 3000 series –

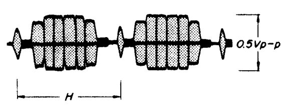
VIDEO VIDEO


H
I
J
K
L
M
N
O
SF-5BOARD
SL-3BOARD
IC1 TA7060AP LIMITER
D1 1SS133
D2 1SS133
Q7 2SC2785 AMP
IC8 BX1032 PRE EMPH
IC9 BX1033 DE EMP-1
PHASE COMPENSATION
DE-EMPHASIS
4.5MHz TRAP
IC3 BX1021 MOD/DE MOD
IC10 BX1034 DE EMPH-2
EXPANDER
DE-EMPHASIS
HALF H SHIFT CANCELLER
APERTURE COMPENSATION
LEVEL ADJ
IC7 BX1027 AFC/COMB
CONV
1/8
VCO
LPF
ØDET
REVERSE
BPF
Q2 2SA1115
IC5 BX1025 ACC
BURST EMPHA
QUASI BURST
SYNC DET
APC DET
B-ID DET
FF
CHROMA REVERSE (B-ID)
ACK DET
ACK
ACC DET (HIGH SPEED)
ACC AMP
BURST GATE
PEAK HOLD
DC AMP
IC6 BX1026 A FDR
REF OSC
AF DR
FLITER
X3
Q6 2SC2785 SWITCHING
D2,4 1SS119
D1 1SS119
IC1 CX894 PILOT BURST INSERT
MUTE
TP-2
TP-3
TP-4
1 GND
2 HD
3 AFC PULSE
4 CLOCK
5 REG 9V
6 RF SW
7 CF
8 PILOT BURST FLAG
9 PILOT BURST FLAG
10 VC
11 VC
12 VX
IC102 CX7906 FLAG GENERATOR
COUNTER
MONO MULTI 1
MONO MULTI 2
MONO MULTI 3
IC101 CX7905A COUNTER
1/3
1/117
1/119
IC104 μPC78L05A 5V REG
REG 5V
SF-6BOARD
IC103 CX20008 VCO
CN2 (BLK)
1 GND BLK
2 4.43 REF WHT
3 GND ORG
4 HD YEL
5 PB CHROMA WHT
6 ACK BLU
7 REC CHROMA VIO
8 JOG GRY
9 CF WHT
10 BURST FLAG BLK

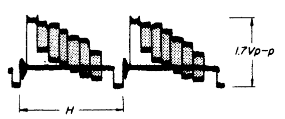
MA-3 (VIDEO & POWER SUPPLY)
— Ref. No. 1000 series —


A
B
C
D
E
F
G
H
1
2
3
4
5

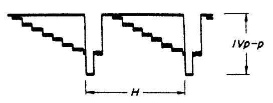
MA-3 (VIDEO/POWER) BOARD



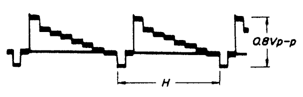
IC3 ③ PB



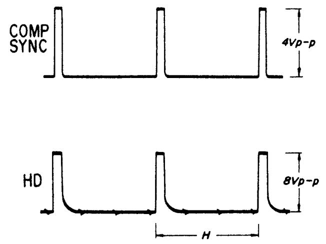
IC3 ⑨ PB



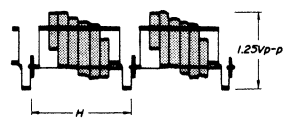
IC3 ㉓ REC



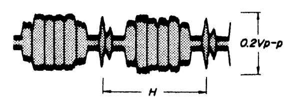
IC4 ② PB


COMP SYNC
4Vp-p
HD
8Vp-p
H

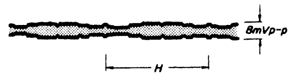
IC4 ⑯, ⑱ REC/PB



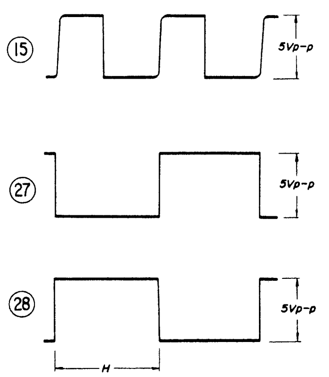
IC4 ㉒ REC



IC5 ③ PB

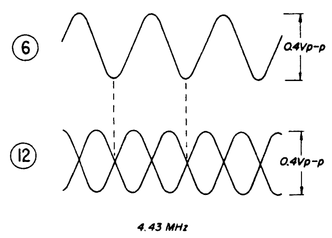


IC5 ⑨ PB


⑮
5Vp-p
㉗
5Vp-p
㉘
5Vp-p
H

IC7 ⑮ REC/PB

IC6 ㉗, ㉘ REC/PB


⑥
0.4Vp-p
⑫
0.4Vp-p
4.43 MHz

IC7 ⑥, ⑫ PB

NOTES:

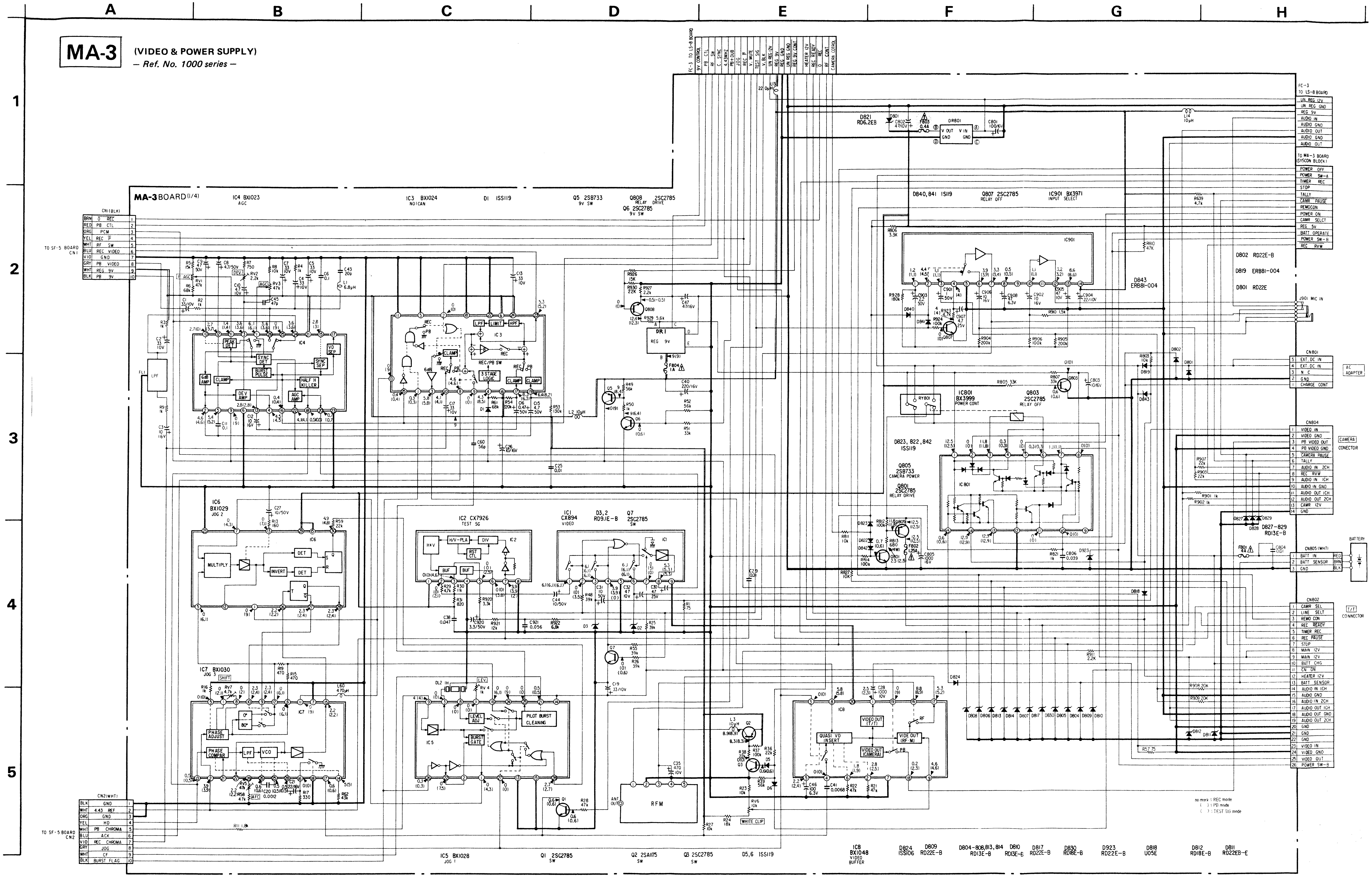
- All resistors are in ohms, 1/8W unless otherwise noted. kΩ = 1000Ω; MΩ = 1000kΩ
- All capacitors are in μF unless otherwise noted. p : μμF 50WV or less are not indicated except for electrolytics.
- All variable and adjustable resistors have characteristic curve B, unless otherwise noted.
- ▨ : nonflammable resistor.
- The red lines show the main voltages.
- Marked * is not able to measure the voltage of it's position.
- All voltages are dc measured with a DMT (1MΩ/V).

The components identified by shading and ⚠ mark are critical for safety. Replace only with part number specified.

When indicating parts by reference number, please include the board name.

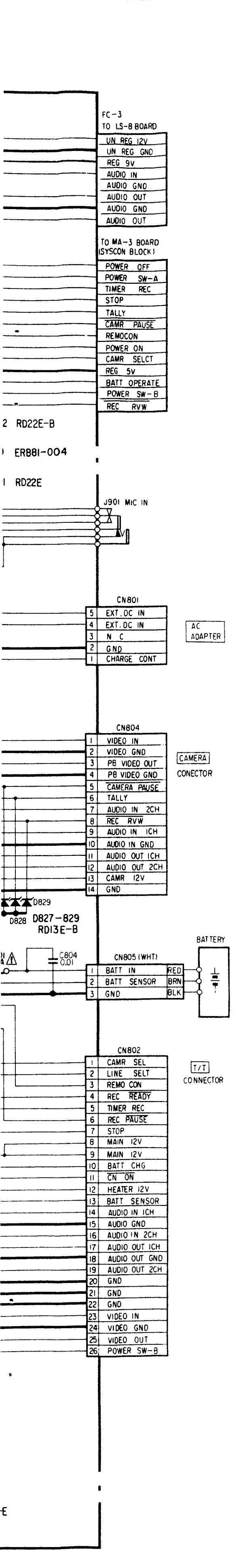
MA-3 (VIDEO & POWER SUPPLY)

— Ref. No. 1000 series —

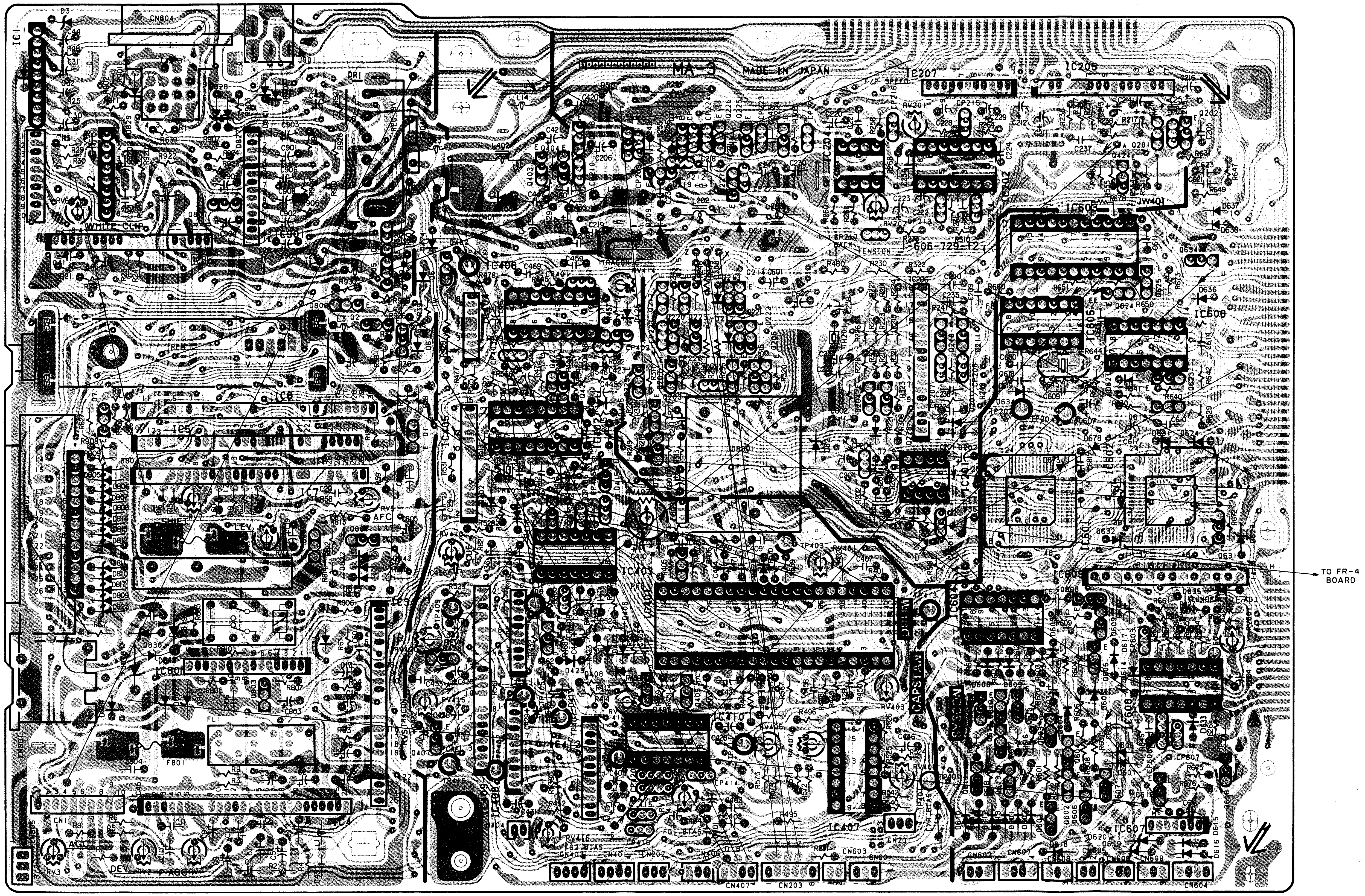


A
B
C
D
E
F
G
H
1
2
3
4
5
MA-3 BOARD (1/4)
CN1 (BLK)
TO SF-5 BOARD CN1
O REC
PB CTL
PCM
REC P
RF SW
REC VIDEO
GND
PB VIDEO
REG 9V
PB 9V
IC4 BX1023 AGC
IC3 BX1024 NOICAN
D1 1SS119
Q5 2SB733 9V SW
Q808 2SC2785 RELAY DRIVE
Q6 2SC2785 9V SW
FC-3 TO LS-8 BOARD
9V CONTROL
PB CTL
RF SW
C. SYNC
4.43MHz
PB+DUB
JOG
REC P
V. MUTE
TEST SIG
V. BLK
UN REG 12V
REG 9V
REG GND
UN REG GND
REG 9V CONT
HEATER 12V
REC READY
O REC
RF CONT
CAMERA CONTROL
DR1 REG 9V
F804 1A
F803 0.4A
DR801
V OUT
V IN
GND
D821 RD6.2EB
L14 10μH
FC-3 TO LS-8 BOARD
UN REG 12V
UN REG GND
REG 9V
AUDIO IN
AUDIO GND
AUDIO OUT
AUDIO GND
AUDIO OUT
TO MA-3 BOARD (SYSCON BLOCK)
POWER OFF
POWER SW-A
TIMER REC
STOP
TALLY
CAMR PAUSE
REMOCON
POWER ON
CAMR SELCT
REG 5V
BATT OPERATE
POWER SW-B
REC RVW
D840, 841 1SS119
Q807 2SC2785 RELAY OFF
IC901 BX3971 INPUT SELECT
D802 RD22E-B
D819 ERB81-004
D801 RD22E
D843 ERB81-004
J901 MIC IN
CN801
EXT. DC IN
EXT. DC IN
N C
GND
CHARGE CONT
AC ADAPTER
IC801 BX3999 POWER CONT
Q803 2SC2785 RELAY OFF
RY801
D823, 822, 842 1SS119
Q805 2SB733 CAMERA POWER
Q801 2SC2785 RELAY DRIVE
CN804
VIDEO IN
VIDEO GND
PB VIDEO OUT
PB VIDEO GND
CAMERA PAUSE
TALLY
AUDIO IN 2CH
REC RVW
AUDIO IN 1CH
AUDIO IN GND
AUDIO OUT 1CH
AUDIO OUT 2CH
CAMR 12V
GND
CAMERA CONNECTOR
D827 D828 D829
D827-829 RD13E-B
F801 4A
CN805 (WHT)
BATT IN
BATT SENSOR
GND
BATTERY
CN802
CAMR SEL
LINE SELT
REMO CON
REC READY
TIMER REC
REC PAUSE
STOP
MAIN 12V
MAIN 12V
BATT CHG
CN ON
HEATER 12V
BATT SENSOR
AUDIO IN 1CH
AUDIO GND
AUDIO IN 2CH
AUDIO GND
AUDIO OUT 1CH
AUDIO OUT 2CH
GND
GND
GND
VIDEO IN
VIDEO GND
VIDEO OUT
POWER SW-B
T/T CONNECTOR
IC6 BX1029 JOG 2
MULTIPLY
INVERT
DET
IC2 CX7926 TEST SG
H×V
H/V-PLA
DIV
RST CTL
BUF
IC1 CX894 VIDEO
D3, 2 RD9.1E-B
Q7 2SC2785 SW
IC7 BX1030 JOG 3
SHIFT
PHASE ADJUST
PHASE COMPAR
LPF
VCO
AFC
L60 470μH
CN2 (WHT)
TO SF-5 BOARD CN2
GND
4.43 REF
GND
HD
PB CHROMA
ACK
REC CHROMA
JOG
CF
BURST FLAG
R11 1.8k
LEV
LEVEL ADJ
BURST GATE
PILOT BURST CLEANING
IC5
ANT OUT
RFM
WHITE CLIP
IC8
QUASI VD INSERT
VIDEO OUT (T/T)
VIDEO OUT (CAMERA)
VIDE OUT (RF. M)
PEAK DET
SYNC DET
BURST PULSE
SYNC SEP
VD SEP
6dB AMP
CLAMP
DEV AMP
AGC AMP
HALF H KILLER
LPF
LIMIT
HPF
REC/PB SW
3 STAGE LOGIC
LPF
FLT
no mark : REC mode
( ) : PB mode
( ) : TEST SIG mode
IC5 BX1028 JOG 1
Q1 2SC2785 SW
Q2 2SA1175 SW
Q3 2SC2785 SW
D5,6 1SS119
IC8 BX1048 VIDEO BUFFER
D824 1SS106
D809 RD22E-B
D804-808, 813, 814 RD13E-B
D810 RD13E-B
D817 RD22E-B
D830 RD18E-B
D923 RD22E-B
D818 U05E
D812 RD18E-B
D811 RD22EB-E

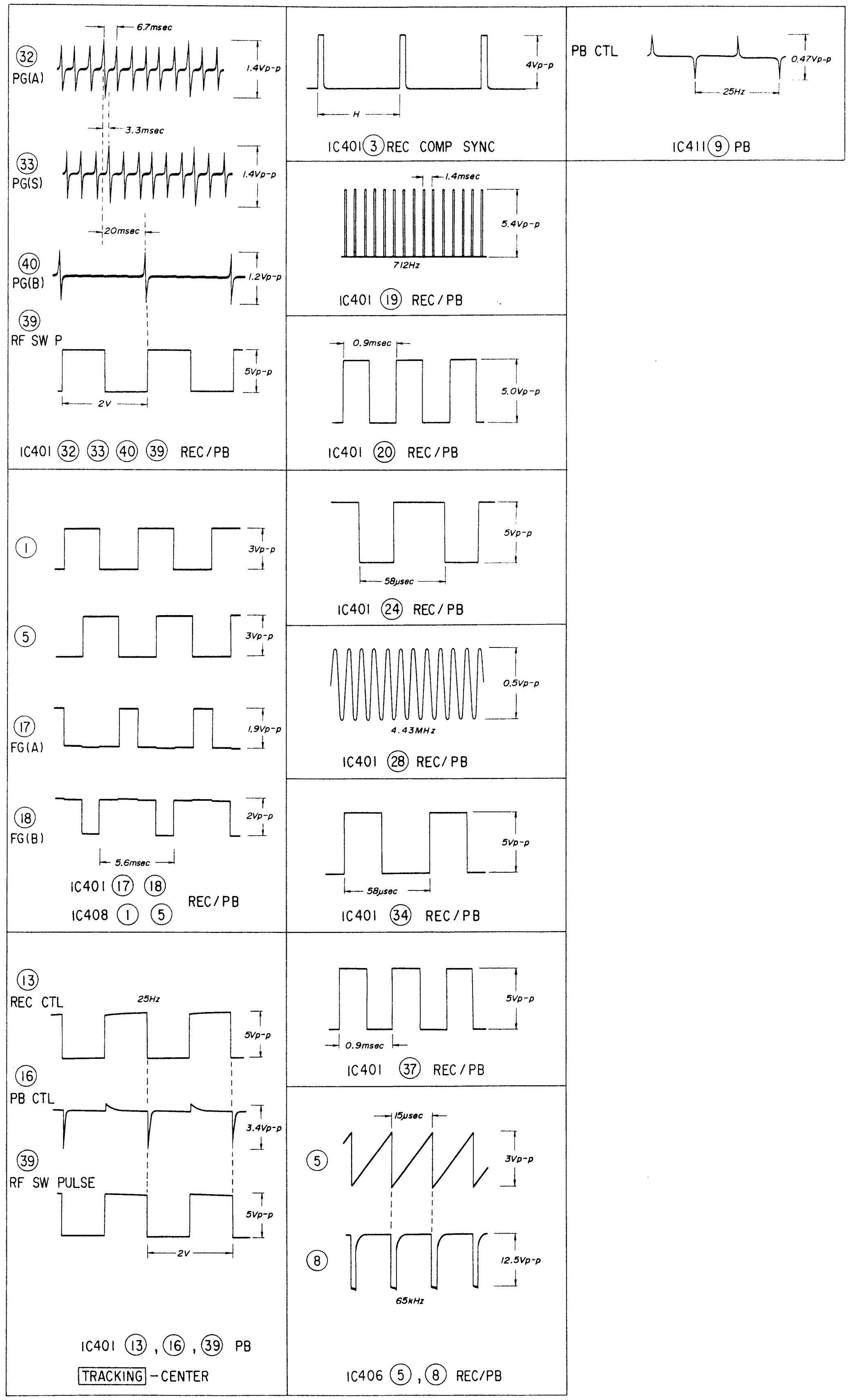
	I	J	K	L	M	N	O	
Q, IC	IC1 IC2 IC8 7	807 IC901 IC5 IC6 IC7 IC801 803 IC4 805	808 2 6,5 3 1 801 IC3 402 IC404 IC405 426 IC409 407 IC406 IC402 IC411 IC408	403,404 218 217 219 216 226 227 422,421 409 IC403 415 408 229 212 220 215 223 213 221 203 207 230 401 209 411 406 IC410 405 IC412	225 224 214 222 208 206 IC401 IC204 204 228 IC206 IC201 IC202 210 IC407	211 IC207 IC605 IC603 IC205 424 624 IC606 625 201 IC601,IC602 619 612 611 IC604 614 610,615 613 603 601 602 608 604 605 609 606 607 IC609 616	202 634 623 631 IC608 IC607 618	Q IC
D	2 3 805 804 807 808 813 812 810 824 817 923	806 829 814 811 809,818 830 802 843 819 801 828,827 841,840 1	822 842 823 6 5 424 403 402,418 419 423	405 425 209 407,406,408 208 212 213	422 821 215	201 202 608 634 609 601,602 610,611,612,613 603 604 605 673,678 618 617 632 621 614 606,607 619,620	631 624 636 615 616 633,635 623	D
ADJ	RV6 RV3 RV2	RV7 RV1 RV4	RV5 RV415 RV420 RV410 RV416	RV414 RV402 RV413 RV417	RV405 RV401 RV407 RV202 RV403 RV201 RV409		RV601	ADJ


H
FC-3
TO LS-8 BOARD
UN REG 12V
UN REG GND
REG 9V
AUDIO IN
AUDIO GND
AUDIO OUT
AUDIO GND
AUDIO OUT
TO MA-3 BOARD (SYSCON BLOCK)
POWER OFF
POWER SW-A
TIMER REC
STOP
TALLY
CAMR PAUSE
REMOCON
POWER ON
CAMR SELCT
REG 5V
BATT OPERATE
POWER SW-B
REC RVW
2 RD22E-B
ERB81-004
1 RD22E
J901 MIC IN
CN801
5 EXT. DC IN
4 EXT. DC IN
3 N C
2 GND
1 CHARGE CONT
AC ADAPTER
CN804
1 VIDEO IN
2 VIDEO GND
3 PB VIDEO OUT
4 PB VIDEO GND
5 CAMERA PAUSE
6 TALLY
7 AUDIO IN 2CH
8 REC RVW
9 AUDIO IN 1CH
10 AUDIO IN GND
11 AUDIO OUT 1CH
12 AUDIO OUT 2CH
13 CAMR 12V
14 GND
CAMERA
CONECTOR
D829
D828
D827-829
RD13E-B
C804 0.01
CN805 (WHT)
1 BATT IN RED
2 BATT SENSOR BRN
3 GND BLK
BATTERY
CN802
1 CAMR SEL
2 LINE SELT
3 REMO CON
4 REC READY
5 TIMER REC
6 REC PAUSE
7 STOP
8 MAIN 12V
9 MAIN 12V
10 BATT CHG
11 CN ON
12 HEATER 12V
13 BATT SENSOR
14 AUDIO IN 1CH
15 AUDIO GND
16 AUDIO IN 2CH
17 AUDIO OUT 1CH
18 AUDIO OUT GND
19 AUDIO OUT 2CH
20 GND
21 GND
22 GND
23 VIDEO IN
24 VIDEO GND
25 VIDEO OUT
26 POWER SW-B
T/T
CONNECTOR

MA-3
BOARD


MA-3
MADE IN JAPAN
CN804
J901
IC1
IC2
IC4
IC5
IC6
IC7
IC8
IC801
WHITE CLIP
SHIFT
LEV
AFC
AGC
DEV
P AGC
FL1
FB01
CN1
TP415
IC205
IC207
IC202
IC204
IC206
IC601
IC602
IC603
IC604
IC605
IC606
IC607
IC401
IC402
IC403
IC404
IC405
IC406
IC407
IC410
TRACKING
TENSION
1-606-729-12
DRUM
CAPSTAN
SYSCON
JW401
CN203
CN401
CN402
CN403
CN405
CN407
CN601
CN602
CN603
CN604
CN606
CN607
CN608
TO FR-4 BOARD

MA–3 (CAPSTAN/DRUM SERVO) BOARD



IC401 ㉜ ㉝ ㊵ ㊴ REC/PB

IC401③ REC COMP SYNC

IC411⑨ PB

IC401 ⑲ REC/PB

IC401 ⑳ REC/PB

IC401 ⑰ ⑱
IC408 ① ⑤ REC/PB

IC401 ㉔ REC/PB

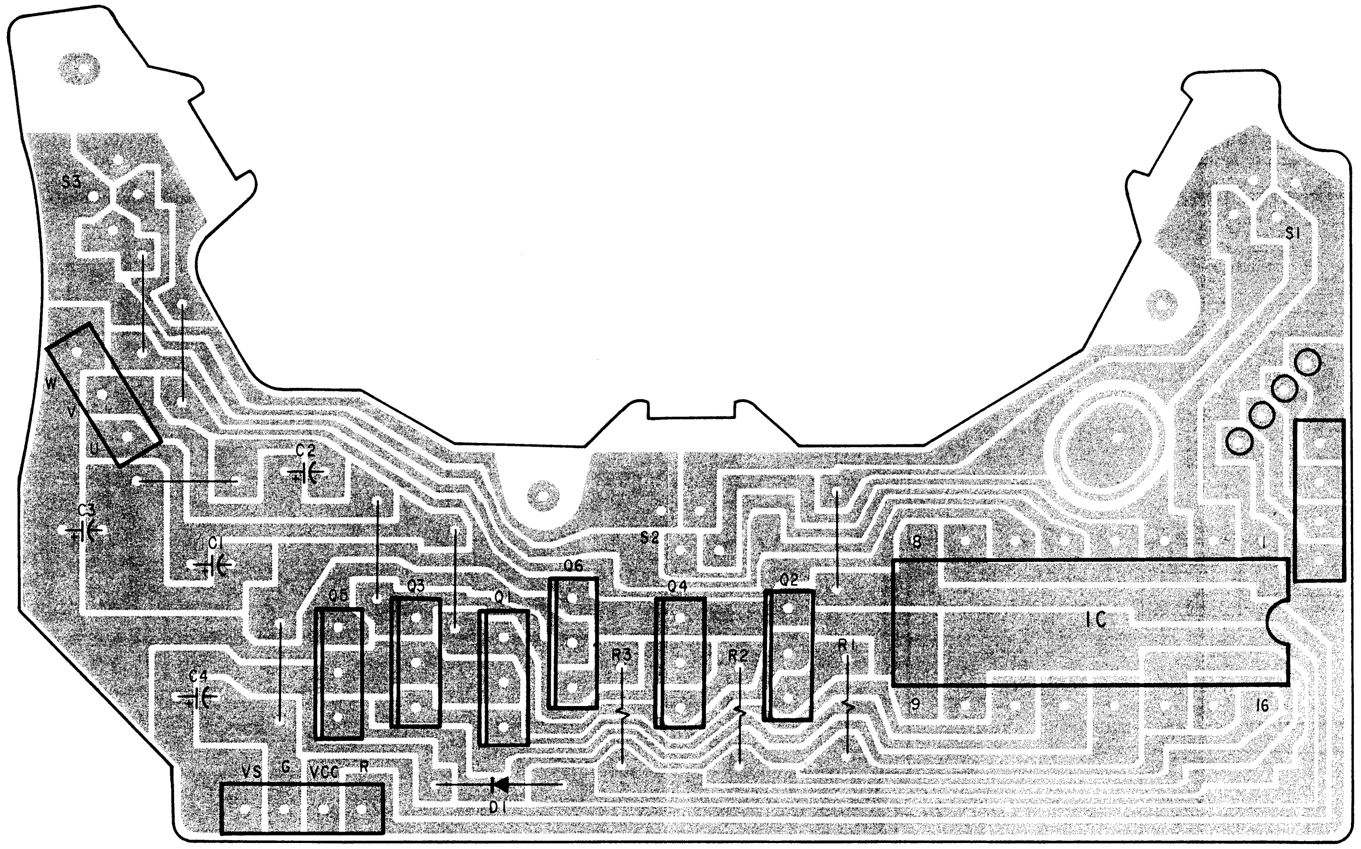
IC401 ㉘ REC/PB

IC401 ㉞ REC/PB

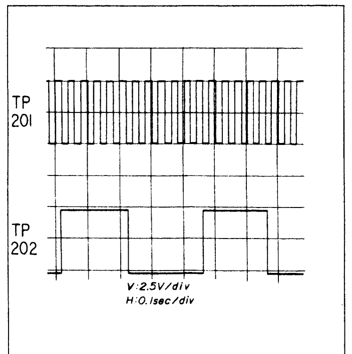
IC401 ⑬, ⑯, ㊴ PB
TRACKING –CENTER

IC401 ㊲ REC/PB

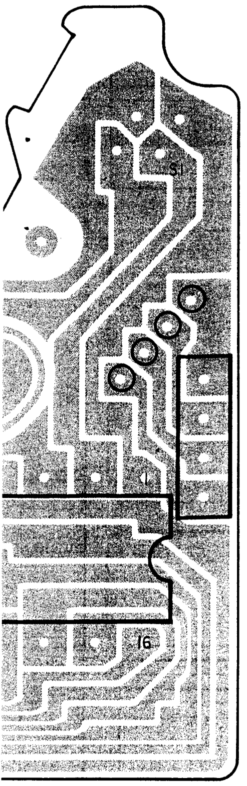
IC406 ⑤, ⑧ REC/PB

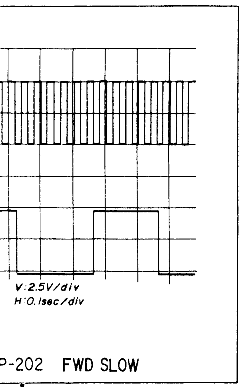

S3
W
V
C2
C3
C1
C4
Q5
Q3
Q1
Q6
Q4
Q2
R3
R2
R1
S2
S1
8
IC
9
16
VS
G
VCC
R
D1

LS–8 (TRICK PLAY) BOARD



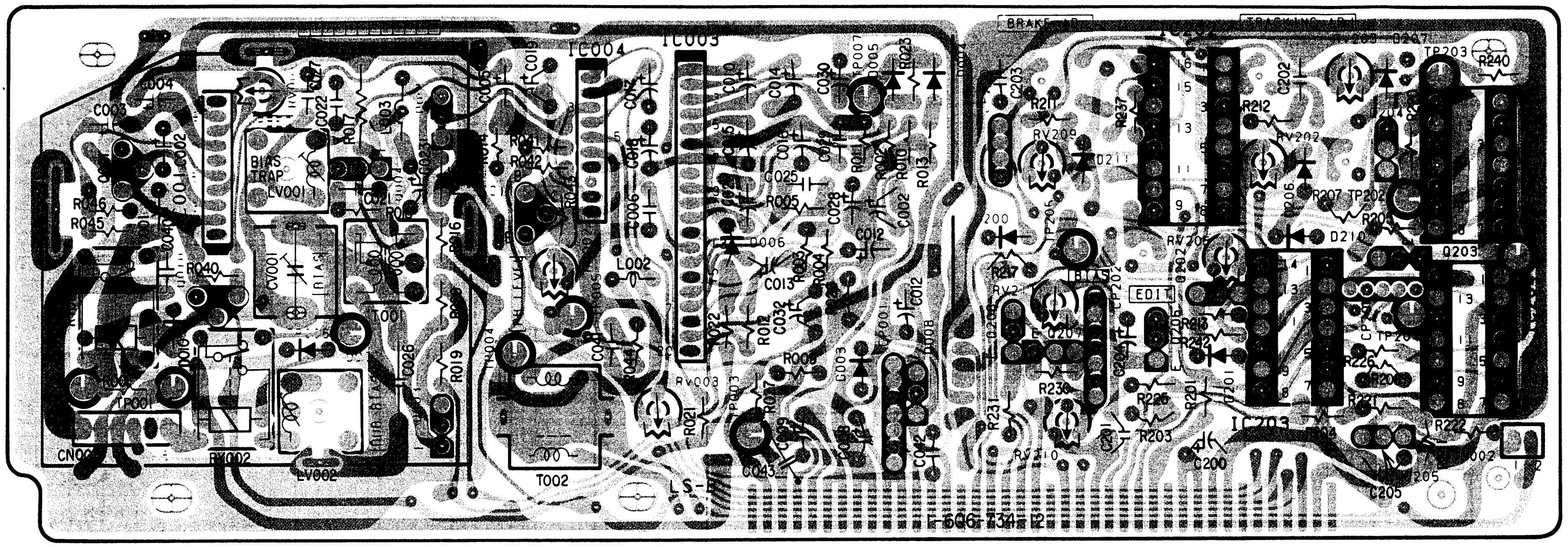
TP-201 TP-202 FWD SLOW

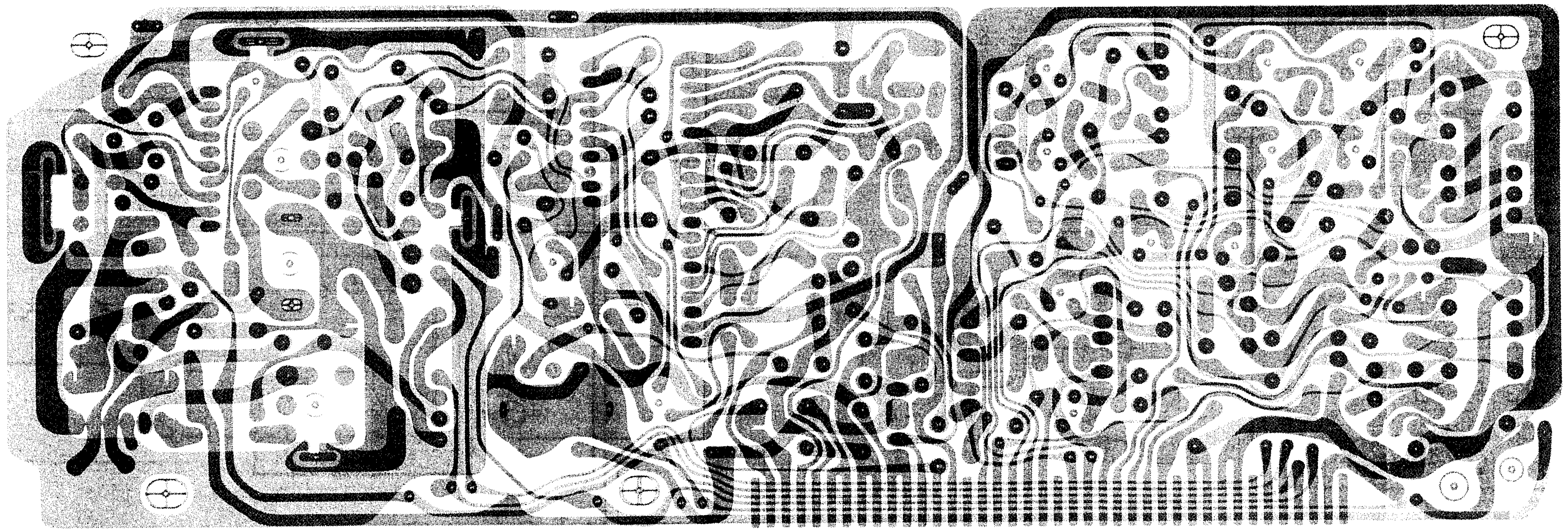




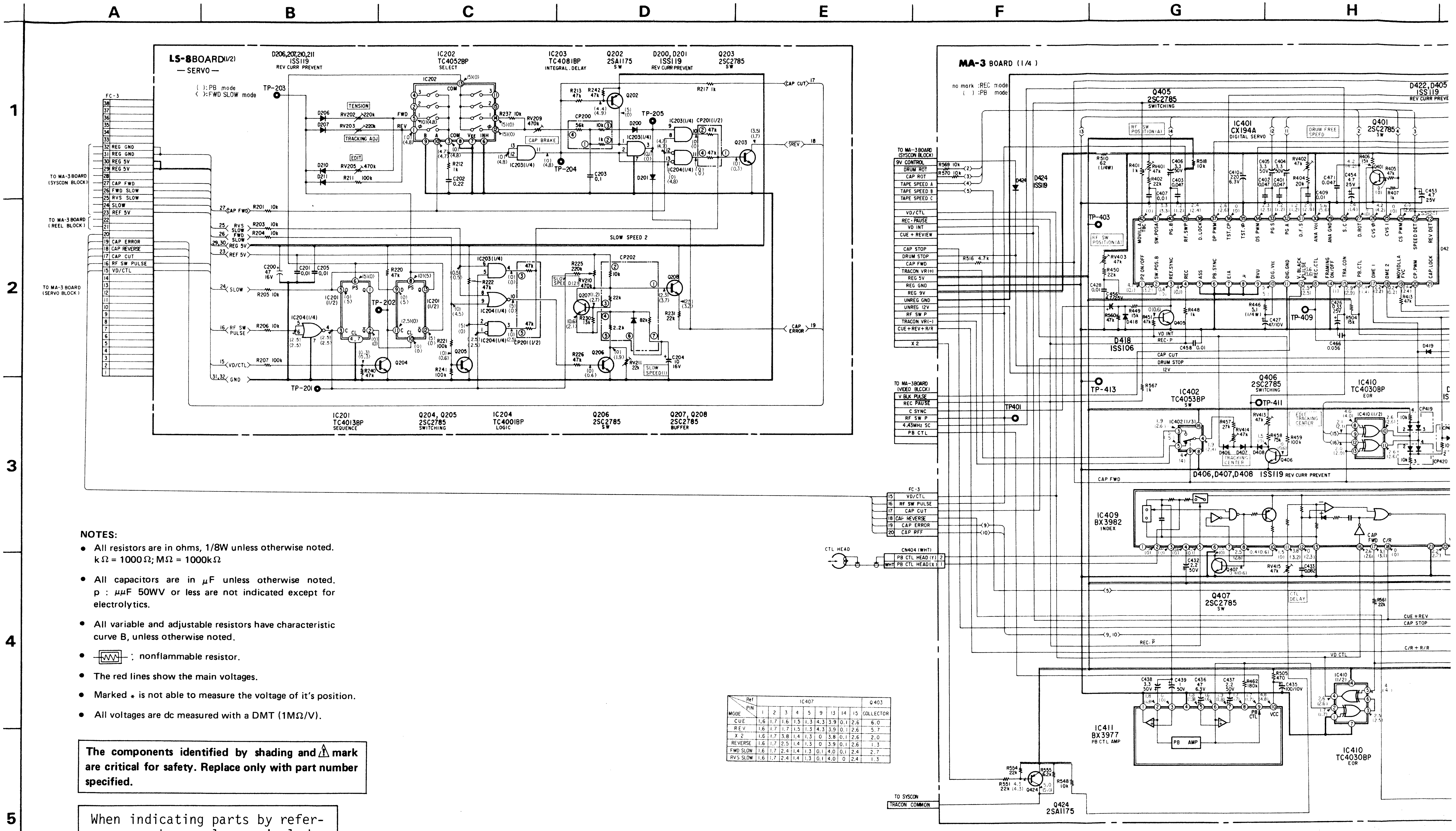
LS-8 BOARD

Q, IC	001 IC001 010 004 005 003 011 IC004 IC003 008 208 207 206 IC202 202 IC203 204 205 203 IC201 IC204	Q, IC
D	001 002 006 003 005,004 200 211 201 210 206 207	D
ADJ	RV001,LV001 CV001,LV002 RV002 RV003 RV209 RV210 RV211 RV205 RV202 RV203	ADJ


IC004
IC003
BRAKE
TRACKING
BIAS TRAP
LV001
CV001
T001
T002
LV002
RV002
RV003
RV209
RV210
IC203
TP203
R240
CN001
LS-8



CAPSTAN/DRUM SERVO CAPSTAN/DRUM SERVO


A
B
C
D
E
F
G
H
1
2
3
4
5
LS-8 BOARD (1/2)
— SERVO —
( ): PB mode
⟨ ⟩: FWD SLOW mode
FC-3
TO MA-3 BOARD (SYSCON BLOCK)
TO MA-3 BOARD (REEL BLOCK)
TO MA-3 BOARD (SERVO BLOCK)
D206,207,210,211 ISS119 REV CURR PREVENT
IC202 TC4052BP SELECT
IC203 TC4081BP INTEGRAL. DELAY
Q202 2SA1175 SW
D200, D201 ISS119 REV CURR PREVENT
Q203 2SC2785 SW
TP-203
TP-204
TP-205
TP-202
TP-201
TENSION
TRACKING ADJ
EDIT
CAP BRAKE
SLOW SPEED 2
SLOW SPEED (1)
CAP CUT
REV
CAP ERROR
IC201 TC4013BP SEQUENCE
Q204, Q205 2SC2785 SWITCHING
IC204 TC4001BP LOGIC
Q206 2SC2785 SW
Q207, Q208 2SC2785 BUFFER
MA-3 BOARD (1/4)
no mark :REC mode
( ) :PB mode
Q405 2SC2785 SWITCHING
IC401 CX194A DIGITAL SERVO
Q401 2SC2785 SW
D422, D405 ISS119 REV CURR PREVENT
TO MA-3 BOARD (SYSCON BLOCK)
9V CONTROL
DRUM ROT
CAP ROT
TAPE SPEED A
TAPE SPEED B
TAPE SPEED C
VD/CTL
REC PAUSE
VD INT
CUE + REVIEW
CAP STOP
DRUM STOP
CAP FWD
TRACON VR(+)
REG 5V
REG GND
REG 9V
UNREG GND
UNREG 12V
RF SW P
TRACON VR(-)
CUE + REV + R/R
X 2
TO MA-3 BOARD (VIDEO BLOCK)
V BLK PULSE
REC PAUSE
C SYNC
RF SW P
4.43MHz SC
PB CTL
TP-403
TP-409
TP-413
TP401
TP-411
D418 ISS106
D424 ISS119
IC402 TC4053BP SW
Q406 2SC2785 SWITCHING
IC410 TC4030BP EOR
D406, D407, D408 ISS119 REV CURR PREVENT
EDIT TRACKING CENTER
TRACKING CENTER
IC409 BX3982 INDEX
CTL HEAD
CN404 (WHT)
PB CTL HEAD (Y)
PB CTL HEAD (X)
CAP FWD C/R
Q407 2SC2785 SW
CTL DELAY
CUE + REV
CAP STOP
C/R + R/R
VD CTL
REC P
IC411 BX3977 PB CTL AMP
PB AMP
IC410 TC4030BP EOR
Q424 2SA1175
TO SYSCON
TRACON COMMON

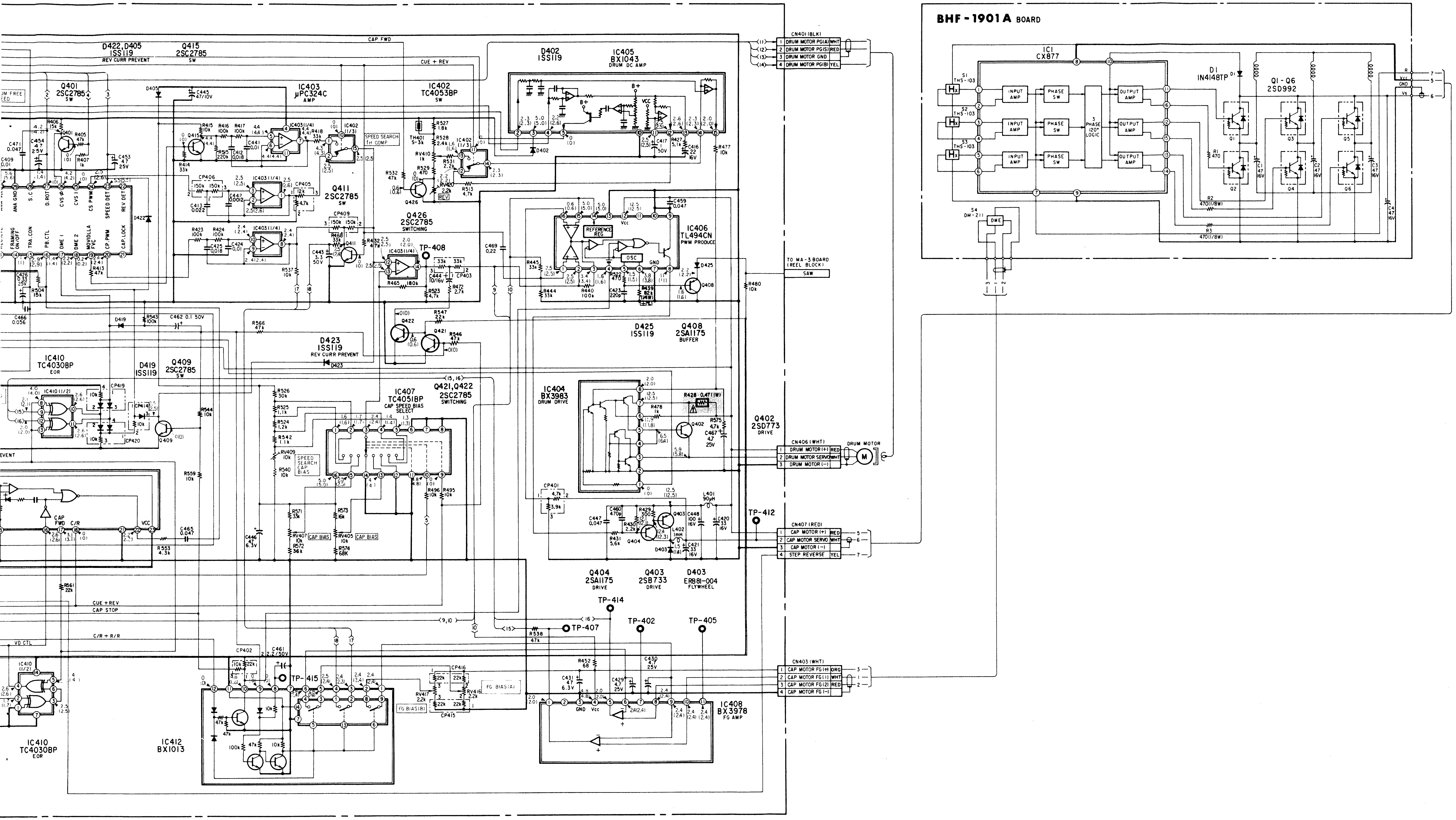
Ref / PIN / MODE	IC407									Q403
	1	2	3	4	5	9	13	14	15	COLLECTOR
CUE	1.6	1.7	1.6	1.5	1.3	4.3	3.9	0.1	2.6	6.0
REV	1.6	1.7	1.7	1.5	1.3	4.3	3.9	0.1	2.6	5.7
X 2	1.6	1.7	3.8	1.4	1.3	0	3.8	0.1	2.6	2.0
REVERSE	1.6	1.7	2.5	1.4	1.3	0	3.9	0.1	2.6	1.3
FWD SLOW	1.6	1.7	2.4	1.4	1.3	0.1	4.0	0.1	2.4	2.7
RVS SLOW	1.6	1.7	2.4	1.4	1.3	0.1	4.0	0	2.4	1.3

NOTES:

- All resistors are in ohms, 1/8W unless otherwise noted. kΩ = 1000Ω; MΩ = 1000kΩ
- All capacitors are in μF unless otherwise noted. p : μμF 50WV or less are not indicated except for electrolytics.
- All variable and adjustable resistors have characteristic curve B, unless otherwise noted.
- ▭ : nonflammable resistor.
- The red lines show the main voltages.
- Marked * is not able to measure the voltage of it's position.
- All voltages are dc measured with a DMT (1MΩ/V).

The components identified by shading and ⚠ mark are critical for safety. Replace only with part number specified.

```
When indicating parts by refer-
ence number, please include
the board name.
```


D422,D405
1SS119
REV CURR PREVENT
Q415
2SC2785
SW
Q401
2SC2785
SW
IC403
μPC324C
AMP
IC402
TC4053BP
SW
D402
1SS119
IC405
BX1043
DRUM DC AMP
CN401 (BLK)
DRUM MOTOR PG(A)
DRUM MOTOR PG(S)
DRUM MOTOR GND
DRUM MOTOR PG(B)
BHF-1901A BOARD
IC1
CX877
D1
1N4148TP
Q1-Q6
2SD992
INPUT AMP
PHASE SW
3 PHASE 120° LOGIC
OUTPUT AMP
S1 THS-103
S2 THS-103
S3 THS-103
S4 DM-211
DME
Q411
2SC2785
SW
Q426
2SC2785
SWITCHING
TP-408
IC406
TL494CN
PWM PRODUCE
REFERENCE REG
OSC
TO MA-3 BOARD (REEL BLOCK)
SAW
SPEED SEARCH
FH COMP
D425
1SS119
Q408
2SA1175
BUFFER
D423
1SS119
REV CURR PREVENT
IC410
TC4030BP
EOR
D419
1SS119
Q409
2SC2785
SW
IC407
TC4051BP
CAP SPEED BIAS SELECT
Q421,Q422
2SC2785
SWITCHING
SPEED SEARCH CAP BIAS
CAP BIAS
IC404
BX3983
DRUM DRIVE
Q402
2SD773
DRIVE
CN406 (WHT)
DRUM MOTOR (+)
DRUM MOTOR SERVO
DRUM MOTOR (−)
DRUM MOTOR
TP-412
CN407 (RED)
CAP MOTOR (+)
CAP MOTOR SERVO
CAP MOTOR (−)
STEP REVERSE
Q404
2SA1175
DRIVE
Q403
2SB733
DRIVE
D403
ERB81-004
FLYWHEEL
TP-414
TP-402
TP-405
TP-407
CUE+REV
CAP STOP
C/R+R/R
VD CTL
CAP FWD
CUE + REV
TP-415
FG BIAS(A)
FG BIAS(B)
IC408
BX3978
FG AMP
CN403 (WHT)
CAP MOTOR FG(1)
CAP MOTOR FG(1)
CAP MOTOR FG(2)
CAP MOTOR FG(−)
IC412
BX1013
IC410
TC4030BP
EOR

A B

1

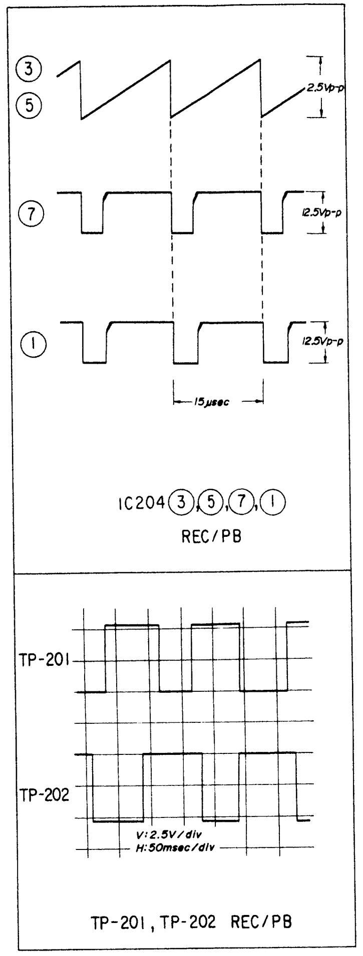
2

3

4

5

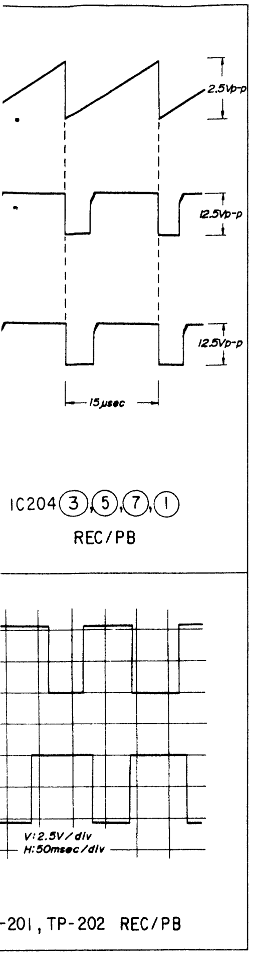
MA-3 (REEL SERVO) BOARD



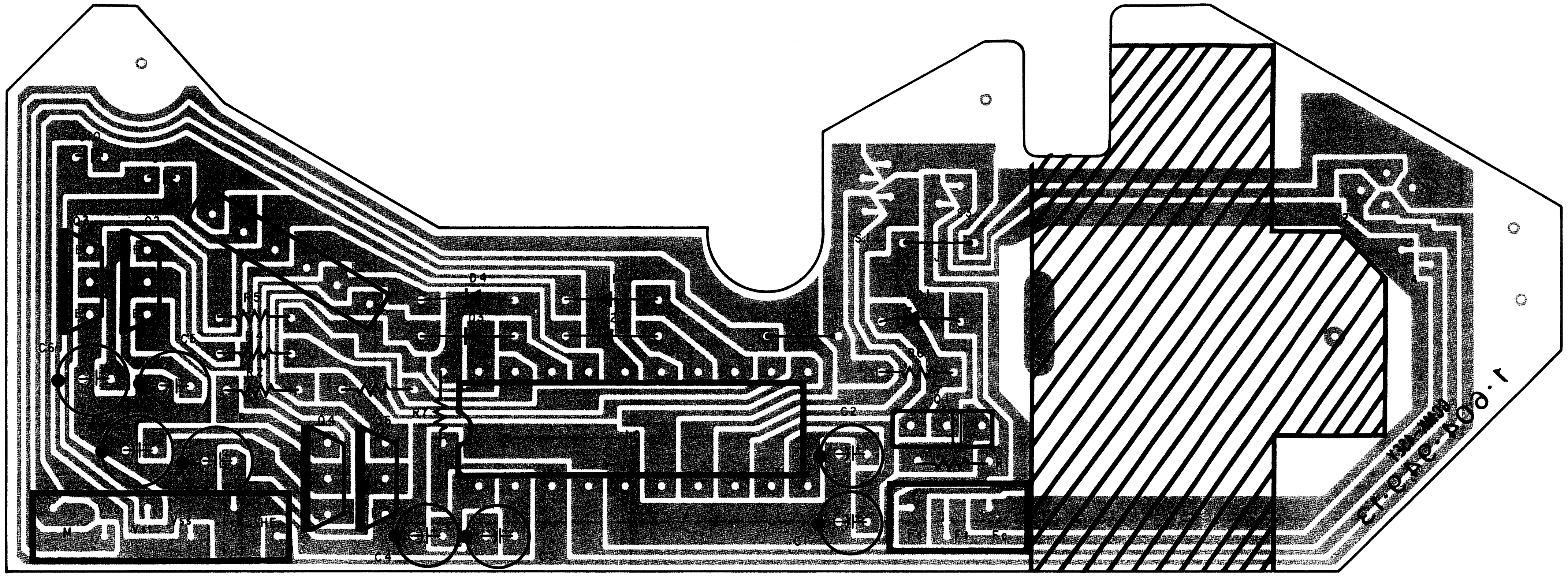
IC204 ③,⑤,⑦,①
REC/PB

TP-201, TP-202 REC/PB

L SERVO) BOARD



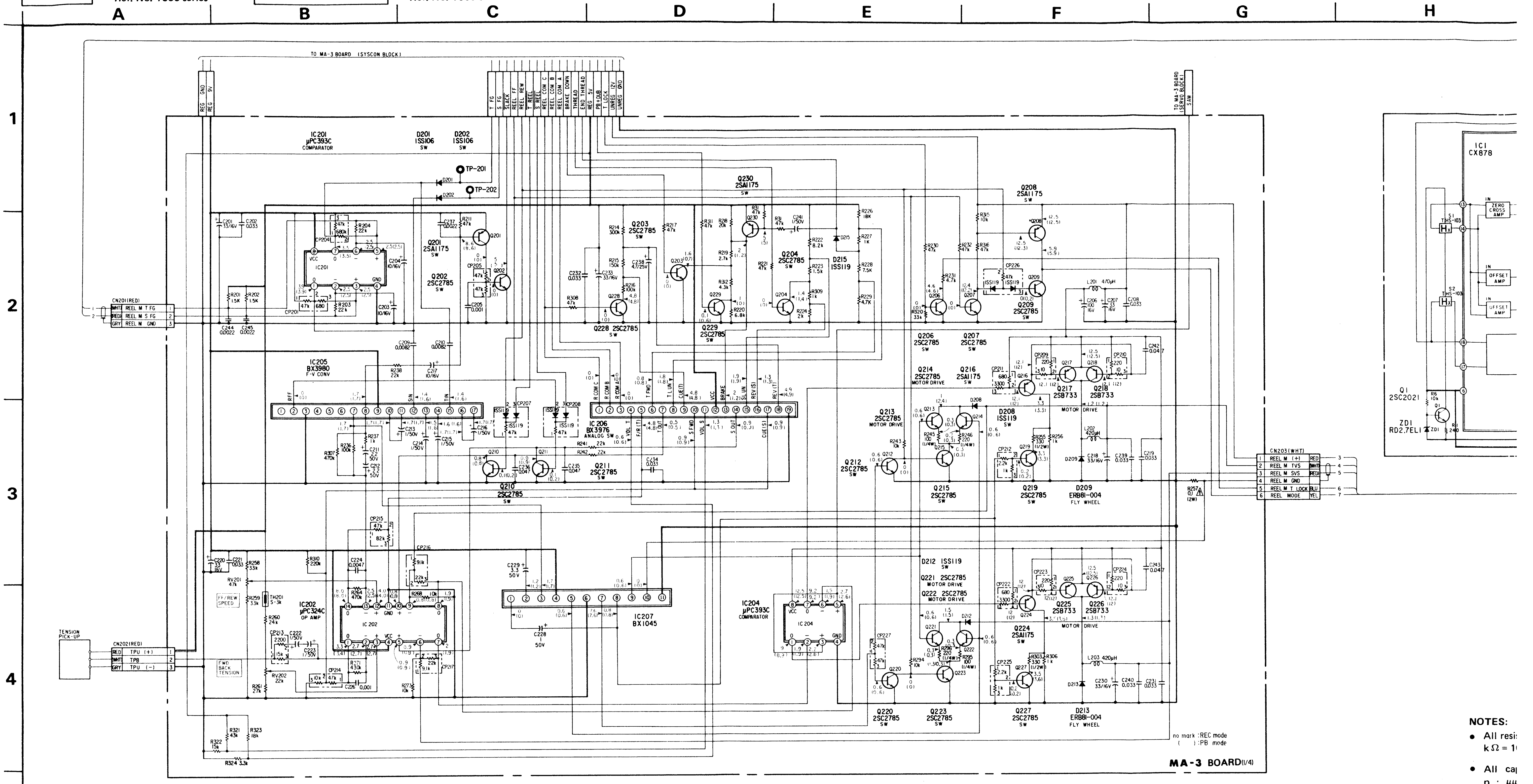
-201, TP-202 REC/PB

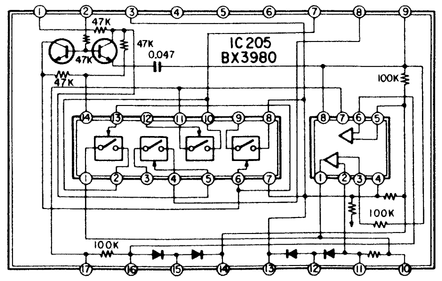

D4
D3
R5
R7
Q4
C6
C5
C4
C2
M

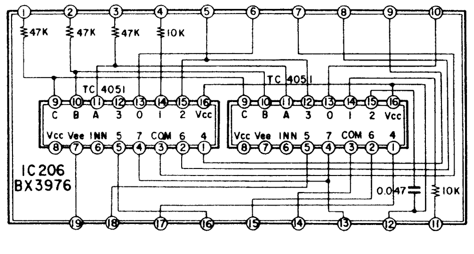
MA-3 (REEL MOTOR DRIVE)
— Ref. No. 1000 series —

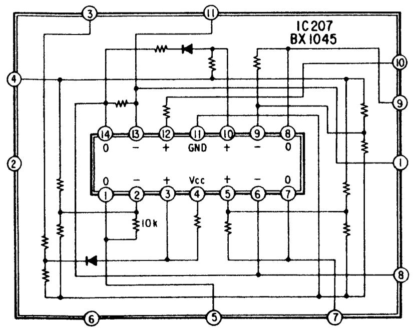
BHF-1800A (REEL MOTOR)
— Ref. No. 1000 series —

REEL SERVO REEL SERVO


A
B
C
D
E
F
G
H
1
2
3
4
5
TO MA-3 BOARD (SYSCON BLOCK)
REG GND
REG 9V
T FG
S FG
SEARCH
REEL FF
REEL REW
T REEL
REEL COM C
REEL COM B
REEL COM A
BRAKE DOWN
THREAD
END THREAD
REG 5V
PB+DUB
LOCK
UNREG 12V
UNREG GND
TO MA-3 BOARD (SERVO BLOCK)
S.AW
IC201 μPC393C COMPARATOR
D201 1SS106 SW
D202 1SS106 SW
TP-201
TP-202
Q230 2SA1175 SW
Q208 2SA1175 SW
Q201 2SA1175 SW
Q202 2SC2785 SW
Q203 2SC2785 SW
Q204 2SC2785 SW
D215 1SS119
Q228 2SC2785 SW
Q229 2SC2785 SW
Q206 2SC2785 SW
Q207 2SC2785 SW
Q209 2SC2785 SW
L201 470μH
CN201(RED)
REEL M T FG
REEL M S FG
REEL M GND
IC205 BX3980 F-V CONV
IC206 BX3976 ANALOG SW
Q210 2SC2785 SW
Q211 2SC2785 SW
Q214 2SC2785 MOTOR DRIVE
Q216 2SA1175 SW
Q217 2SB733
Q218 2SB733
MOTOR DRIVE
Q213 2SC2785 MOTOR DRIVE
D208 1SS119 SW
Q212 2SC2785 SW
Q215 2SC2785 SW
Q219 2SC2785 SW
D209 ERB81-004 FLY WHEEL
L202 420μH
CN203(WHT)
REEL M (+)
REEL M TVS
REEL M SVS
REEL M GND
REEL M T LOCK
REEL MODE
RED
WHT
BLU
YEL
R257 0.1 (2W)
IC1 CX878
ZERO CROSS AMP
OFFSET AMP
S1 THS-103
S2 THS-103
Q1 2SC2021
ZD1 RD2.7EL1
TENSION PICK-UP
CN202(RED)
TPU (+)
TPB
TPU (−)
FF/REW SPEED
RV201 47k
TH201 S-3k
IC202 μPC324C OP AMP
FWD BACK TENSION
RV202 22k
IC207 BX1045
IC204 μPC393C COMPARATOR
D212 1SS119 SW
Q221 2SC2785 MOTOR DRIVE
Q222 2SC2785 MOTOR DRIVE
Q225 2SB733
Q226 2SB733
MOTOR DRIVE
Q224 2SA1175 SW
Q220 2SC2785 SW
Q223 2SC2785 SW
Q227 2SC2785 SW
D213 ERB81-004 FLY WHEEL
L203 420μH
no mark :REC mode
( ) :PB mode
MA-3 BOARD(1/4)


IC205
BX3980
47K
47K
0.047
100K
100K
100K

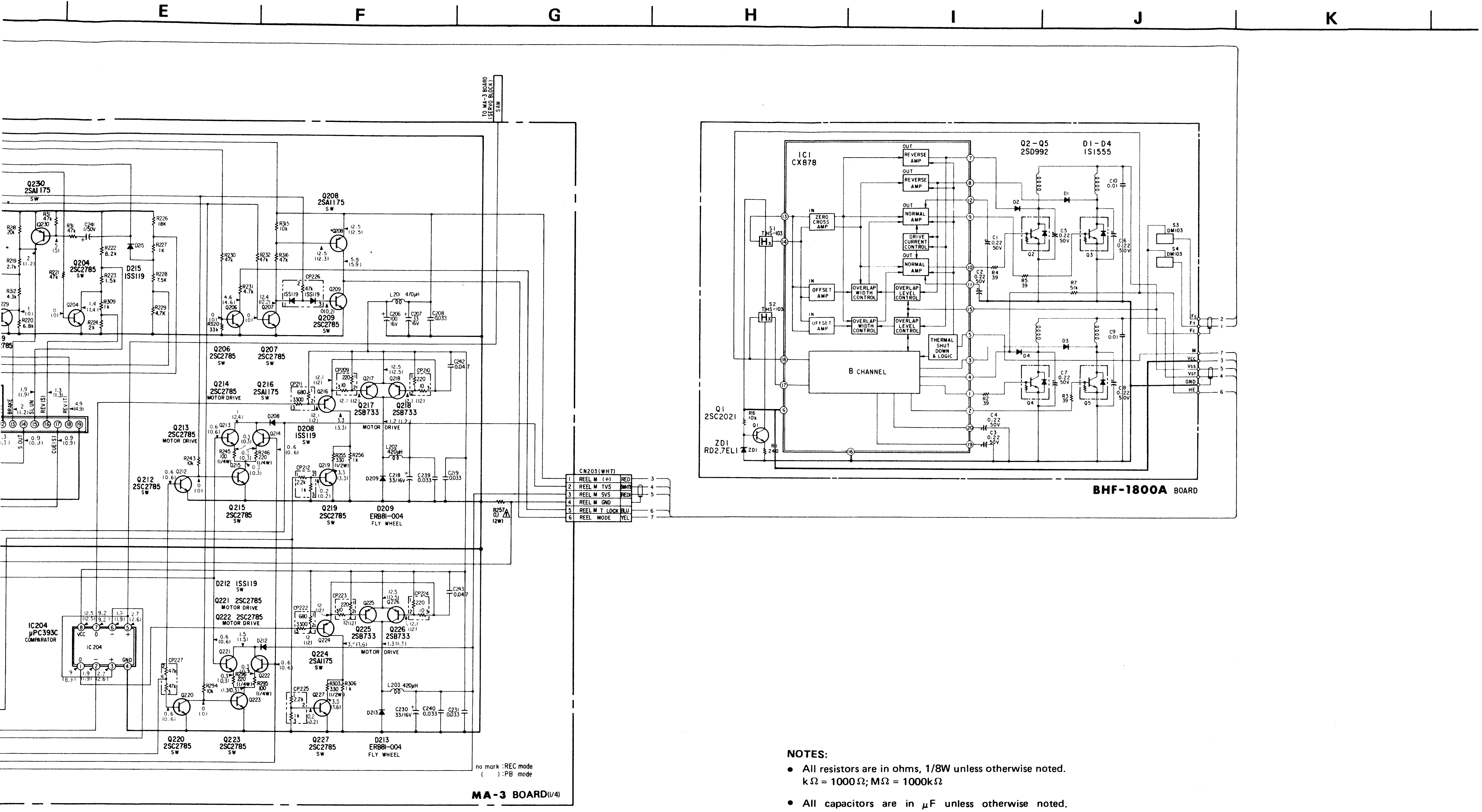

IC206
BX3976
TC 4051
TC 4051
C B A 3 0 1 2 Vcc
Vcc Vee INN 5 7 COM 6 4
47K
10K
0.047

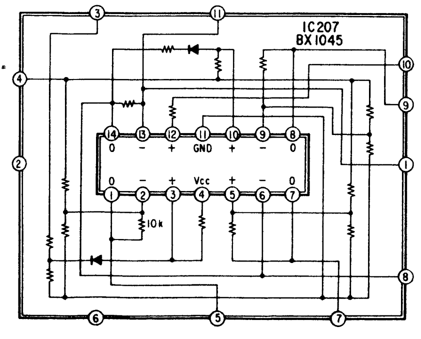

IC207
BX1045
GND
Vcc
10k

Ref / PIN / MODE	IC 206																	Q 217	Q225
	1	2	3	4	5	6	7	8	9	10	11	13	14	15	16	17	18	COLLECTOR	COLLECTOR
FWD	0	0	0	0.6	4.8	0.8	0.8	1.8	4.8	0.9	1.3	1.3	0.9	1.9	1.3	0.9	4.8	1.2	1.3
REVERSE	0	0	5	0.6	4.8	0.8	0.6	1.8	4.8	0.4	1.3	1.3	1.3	1.9	1.3	0.4	4.8	0.7	2.2
CUE	4.8	0	0	0.6	0.8	0.8	0.9	1.8	0.9	0.8	1.3	1.3	0.8	1.9	1.3	0.8	2.3	1.4	1.2
REV	4.8	0	5	0.6	0.8	0.8	1.3	1.8	0.9	0.4	1.3	1.3	2.3	1.9	1.3	0.4	2.3	2.4	4.5
FF	0	5	0	0.6	1.7	0.8	1.7	1.8	4.8	1.6	1.3	2.0	0	1.9	1.3	1.6	4.8	3.1	10.2
REW	0	5	5	0.6	1.9	0.8	0	1.8	4.8	0.6	1.3	2.0	1.9	1.9	1.3	0.6	4.8	10.2	3.6

NOTES:

- All resi
  kΩ = 1
- All ca
  p : μμ
  electro
- All vari
  curve B
-
- The rec
- Marke
- All vol


E
F
G
H
I
J
K
TO MA-3 BOARD (SERVO BLOCK) S.W
Q230 2SA1175 SW
R218 20k
R219 2.7k
R312 4.3k
R220 6.8k
R31 47k
C241 1/50V
R221 47k
R222 8.2k
R223 1.5k
R224 2k
R309 1k
Q204 2SC2785 SW
D215 ISS119
R226 18K
R227 1K
R228 7.5K
R229 4.7K
BRAKE
SL UN
REV(S)
REV(T)
S OUT
CUE(S)
Q208 2SA1175 SW
R315 10k
R316 47k
R230 47k
R232 47k
R231 4.7k
R320 33k
CP226
Q206 2SC2785 SW
Q207 2SC2785 SW
Q209 2SC2785 SW
L201 470μH
C206 100 16V
C207 33 16V
C208 0.033
C242 0.047
Q214 2SC2785 MOTOR DRIVE
Q216 2SA1175 SW
CP211
CP209
CP210
Q217 2SB733
Q218 2SB733
MOTOR DRIVE
Q213 2SC2785 MOTOR DRIVE
D208 ISS119 SW
R245 100 (1/4W)
R246 220 (1/4W)
R243 10k
Q212 2SC2785 SW
Q215 2SC2785 SW
CP212
Q219 2SC2785 SW
R255 330 (1/2W)
R256 1k
L202 420μH
D209 ERB81-004 FLY WHEEL
C218 33/16V
C239 0.033
C219 0.033
R257 0.1 (2W)
CN203(WHT)
1 REEL M (+) RED
2 REEL M TVS WHT
3 REEL M SVS RED
4 REEL M GND
5 REEL M T LOCK BLU
6 REEL MODE YEL
D212 ISS119 SW
Q221 2SC2785 MOTOR DRIVE
Q222 2SC2785 MOTOR DRIVE
IC204 μPC393C COMPARATOR
IC 204
CP227
R294 10k
R296 220 (1/4W)
R295 100 (1/4W)
Q220 2SC2785 SW
Q223 2SC2785 SW
CP222
CP223
CP224
Q224 2SA1175 SW
Q225 2SB733
Q226 2SB733
C243 0.047
CP225
Q227 2SC2785 SW
R303 330 (1/2W)
R306 1k
L203 420μH
D213 ERB81-004 FLY WHEEL
C230 33/16V
C240 0.033
C231 0.033
no mark :REC mode
( ) :PB mode
MA-3 BOARD(1/4)
IC1 CX878
REVERSE AMP
NORMAL AMP
DRIVE CURRENT CONTROL
ZERO CROSS AMP
OFFSET AMP
OVERLAP WIDTH CONTROL
OVERLAP LEVEL CONTROL
THERMAL SHUT DOWN & LOGIC
B CHANNEL
S1 THS-103
S2 THS-103
Q1 2SC2021
R6 10k
R1 240
ZD1 RD2.7EL1
Q2-Q5 2SD992
D1-D4 1S1555
C1 0.22 50V
C2 0.22 50V
C3 0.22 50V
C4 0.22 50V
C5 0.22 50V
C6 0.22 50V
C7 0.22 50V
C8 0.22 50V
C9 0.01
C10 0.01
R2 39
R3 39
R4 39
R5 39
R7 51k
S3 DM103
S4 DM103
Fs
FT
Fc
M
Vcc
Vss
VST
GND
HE
BHF-1800A BOARD


IC207
BX1045
GND
Vcc
10k

Ref / PIN / MODE	IC 206																	Q217	Q225
	1	2	3	4	5	6	7	8	9	10	11	13	14	15	16	17	18	COLLECTOR	COLLECTOR
FWD	0	0	0	0.6	4.8	0.8	0.8	1.8	4.8	0.9	1.3	1.3	0.9	1.9	1.3	0.9	4.8	1.2	1.3
REVERSE	0	0	5	0.6	4.8	0.8	0.6	1.8	4.8	0.4	1.3	1.3	1.3	1.9	1.3	0.4	4.8	0.7	2.2
CUE	4.8	0	0	0.6	0.8	0.8	0.9	1.8	0.9	0.8	1.3	1.3	0.8	1.9	1.3	0.8	2.3	1.4	1.2
REV	4.8	0	5	0.6	0.8	0.8	1.3	1.8	0.9	0.4	1.3	1.3	2.3	1.9	1.3	0.4	2.3	2.4	4.5
FF	0	5	0	0.6	1.7	0.8	1.7	1.8	4.8	1.6	1.3	2.0	0	1.9	1.3	1.6	4.8	3.1	10.2
REW	0	5	5	0.6	1.9	0.8	0	1.8	4.8	0.6	1.3	2.0	1.9	1.9	1.3	0.6	4.8	10.2	3.6

NOTES:

- All resistors are in ohms, 1/8W unless otherwise noted. k Ω = 1000 Ω; M Ω = 1000k Ω
- All capacitors are in μF unless otherwise noted. p : μμF 50WV or less are not indicated except for electrolytics.
- All variable and adjustable resistors have characteristic curve B, unless otherwise noted.
- ▭ : nonflammable resistor.
- The red lines show the main voltages.
- Marked * is not able to measure the voltage of it's position.
- All voltages are dc measured with a DMT (1MΩ/V).

The components identified by shading and ⚠ mark are critical for safety. Replace only with part number specified.

When indicating parts by reference number, please include the board name.

FR-4 (SYSTEM CONTROL CPU-1) *– Ref. No. 4000 series –*

MA-3 (SYSTEM CONTROL CPU-1, CPU-2) *– Ref. No. 1000 series –*

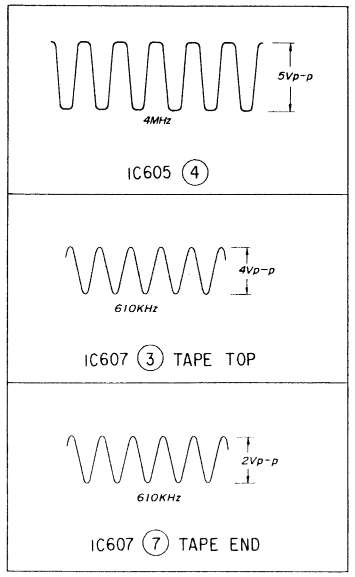
LM-8 (MOTOR FILTER) *– Ref. No. 6000 series –*

LM-10 (MOTOR RESISTOR) *– Ref. No. 7000 series –*

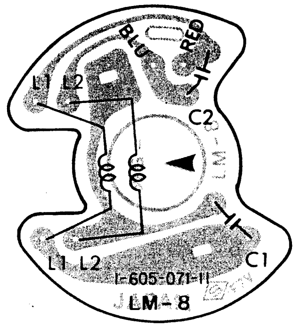
A B C D E F G H

1 2 3 4 5

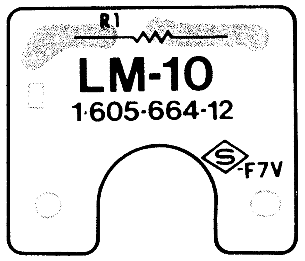
MA-3 (SYSTEM CONTROL) BOARD



LM-8 BOARD

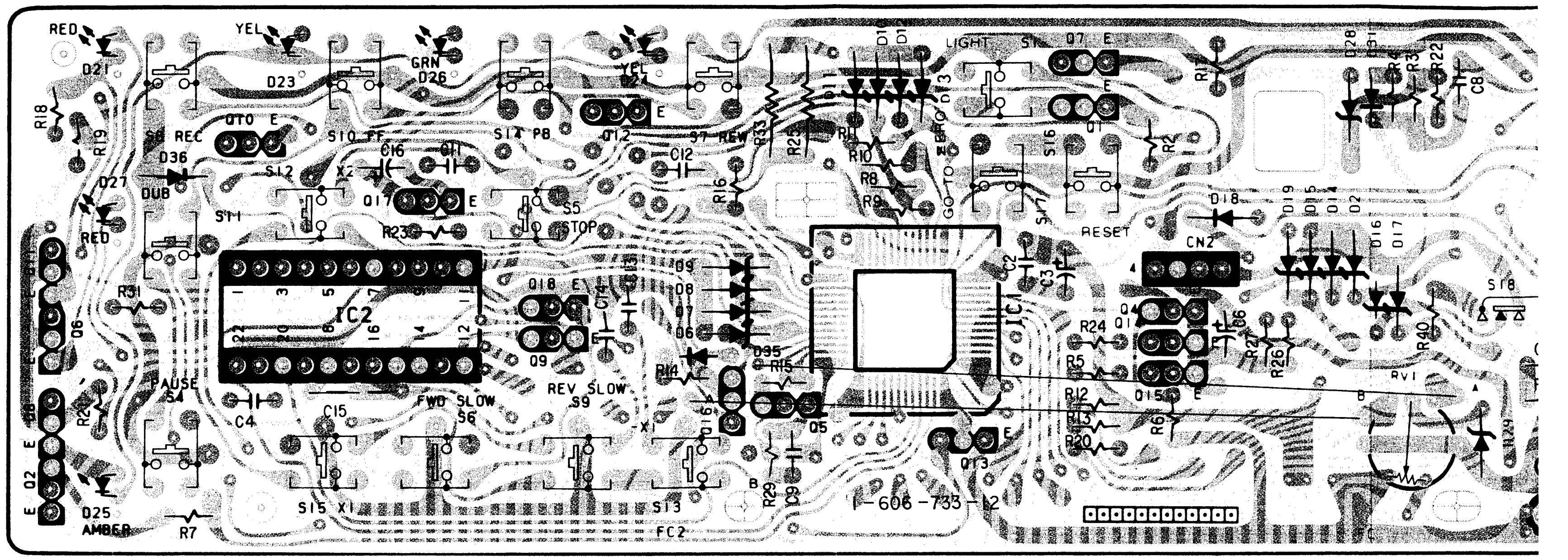

L1 L2
BLU
RED
C2
LM
L1 L2
C1
1-605-071-11
LM-8

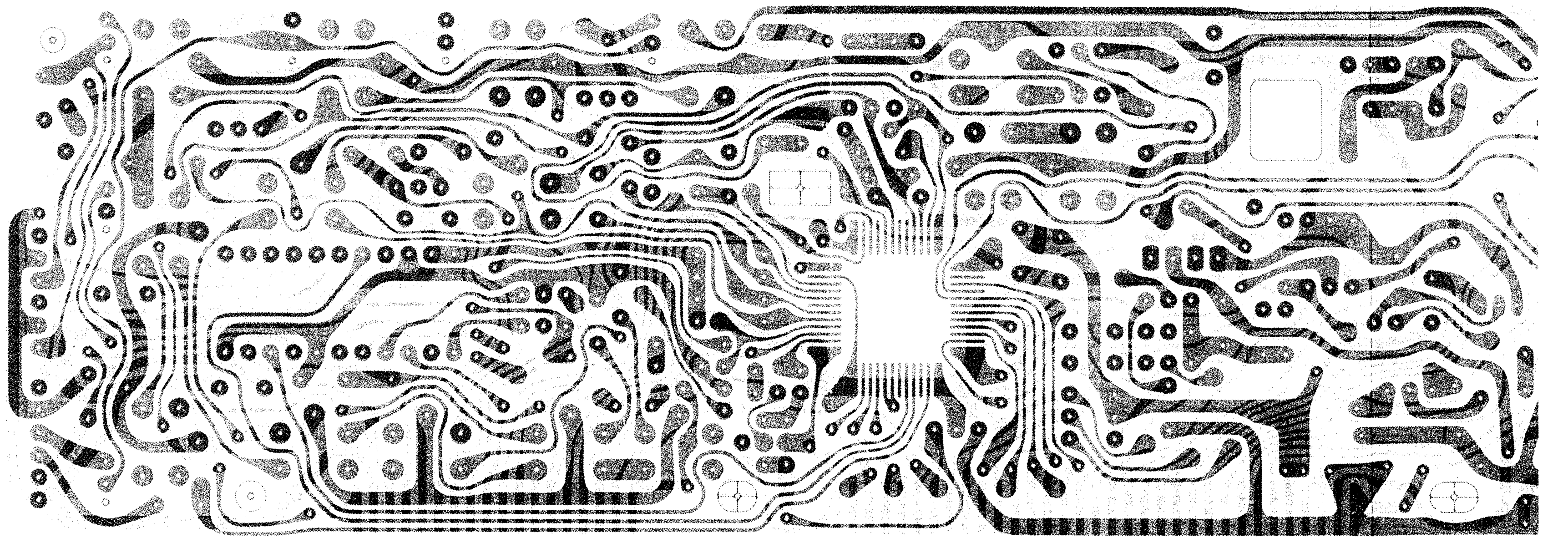
LM-10 BOARD


R1
LM-10
1-605-664-12
S
F7V

FR-4 BOARD

	D	E	F	G	H
Q, IC	6 11 8 2	10 IC2 17	9 18 12 16 5	IC1 13 1 7 14 4 15	
D	27 21 25	36 23 26	24 9 8 7 6	11,10,12,13	18 28,31 19,15,14,2 17 29
ADJ					RV1


RED
D21
YEL
D23
GRN
D26
YEL
D24
R18
R19
S8 REC
Q10 E
S10 FF
S14 PB
Q12 E
S7 REW
R33
R25
R11
R10
R8
R9
D10
D11
D13
ZERO
GO TO
LIGHT
S1
Q7 E
E
Q1
S16
S17
RESET
R2
R17
D28
D31
R4
R3
R22
C8
D36
DUB
D27
RED
S12
X2
C16
C11
C12
R16
Q17 E
S11
S5 STOP
R23
IC2
Q18 E
C14
C13
Q9
D9
D8
D7
D6
D35
R14
R15
IC1
C2
C3
CN2
Q4
Q14
C6
R24
R5
R27
R26
D18
D19
D15
D14
D2
D16
D17
S18
R40
RV1
A
B
Q15 E
R12
R13
R20
R6
R29
R31
Q6
Q8
R21
PAUSE S4
C4
C15
FWD SLOW S6
REV SLOW S9
X1
D16
Q5
Q13 E
R29
C9
E
Q2
E
D25
AMBER
R7
S15 X1
S13
FC2
1-606-733-12

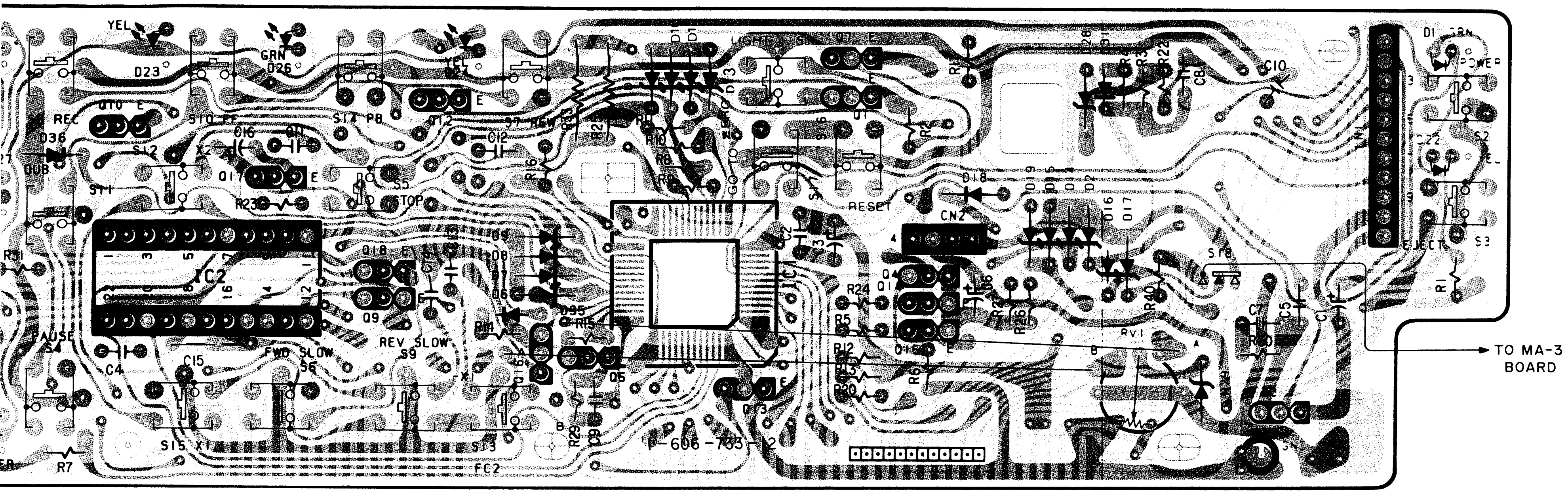


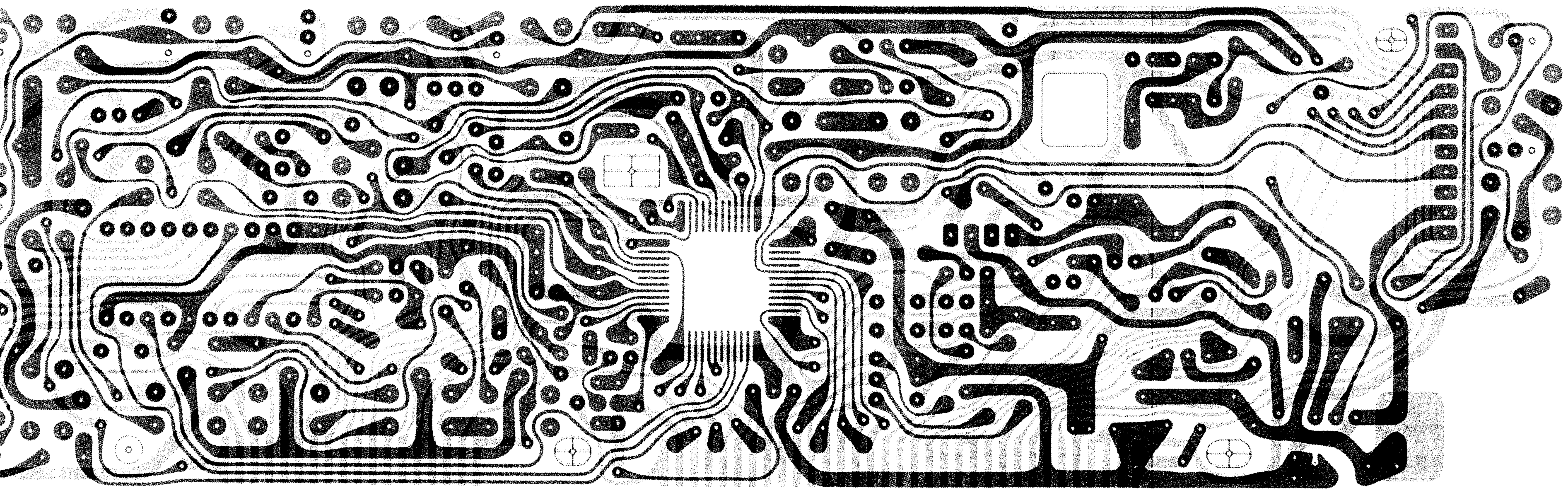
LM-8 (MOTOR FILTER)
— Ref. No. 6000 series —

LM-10 (MOTOR RESISTOR)
— Ref. No. 7000 series —

SYSTEM CONTROL SYSTEM CONTROL

E	F	G	H	I	
10, IC2, 17	9, 18, 12, 16, 5	IC1, 13, 7, 1, 14, 4, 15		3	Q, IC
36, 23, 26	24, 9, 7, 8, 6	11,10,12,13	18, 28,31, 19,15,14,2, 17, 29	22, 1	D
			RV1		ADJ


YEL
D23
GRN
D26
YEL
REC
Q10
D36
S12
X2
S10 FF
Q16
Q11
S14 PB
Q12
S7 REW
D27
DUB
S11
Q17
R23
S5 STOP
R16
R2
LIGHT
S8
Q7
D1
D11
D13
GO
R8
R6
S16
Q1
RESET
R4
D28
S1
R3
R22
C8
C10
D1
POWER
S2
S3
EJECT
IC2
R31
Q18
Q9
D9
D8
D6
D35
R15
IC1
Q2
C3
C1
CN2
D18
D19
D15
D14
D2
D16
D17
S18
R1
R24
Q4
Q1
R5
R12
R13
R20
R9
R6
Q15
D6
R25
R26
RV1
C7
C5
C2
R30
PAUSE
S4
C4
C15
FWD SLOW
S6
REV SLOW
S9
R11
Q5
Q13
R28
S15
X1
S13
FC2
R7
1-606-703-12
TO MA-3 BOARD



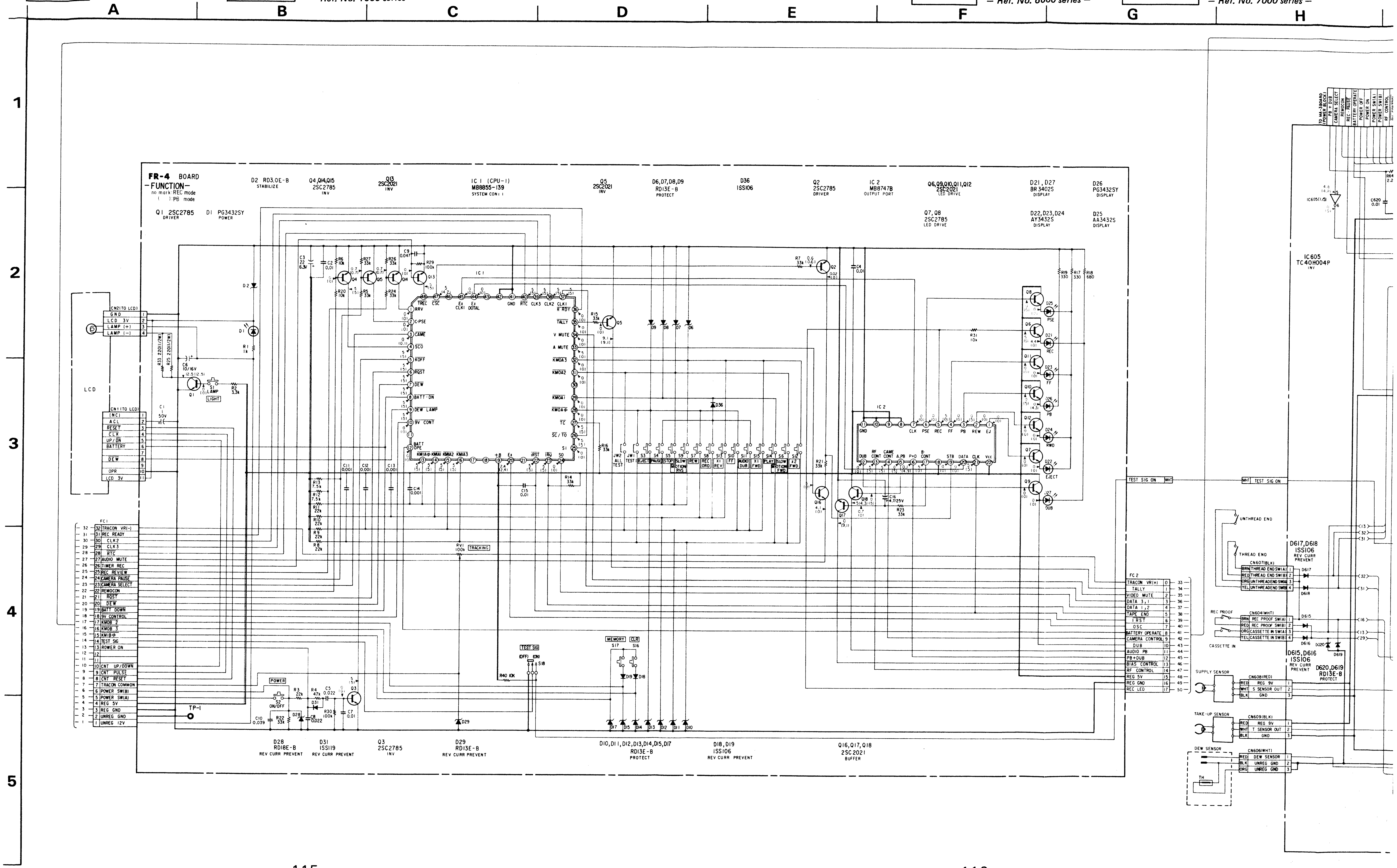
NOTES:

- All resistors are in ohms, 1/8W unless otherwise noted. kΩ = 1000Ω; MΩ = 1000kΩ
- All capacitors are in μF unless otherwise noted. p : μμF 50WV or less are not indicated except for electrolytics.
- All variable and adjustable resistors have characteristic curve B, unless otherwise noted.
- ─[WW]─ : nonflammable resistor.
- The red lines show the main voltages.
- Marked * is not able to measure the voltage of it's position.
- All voltages are dc measured with a DMT (1MΩ/V).

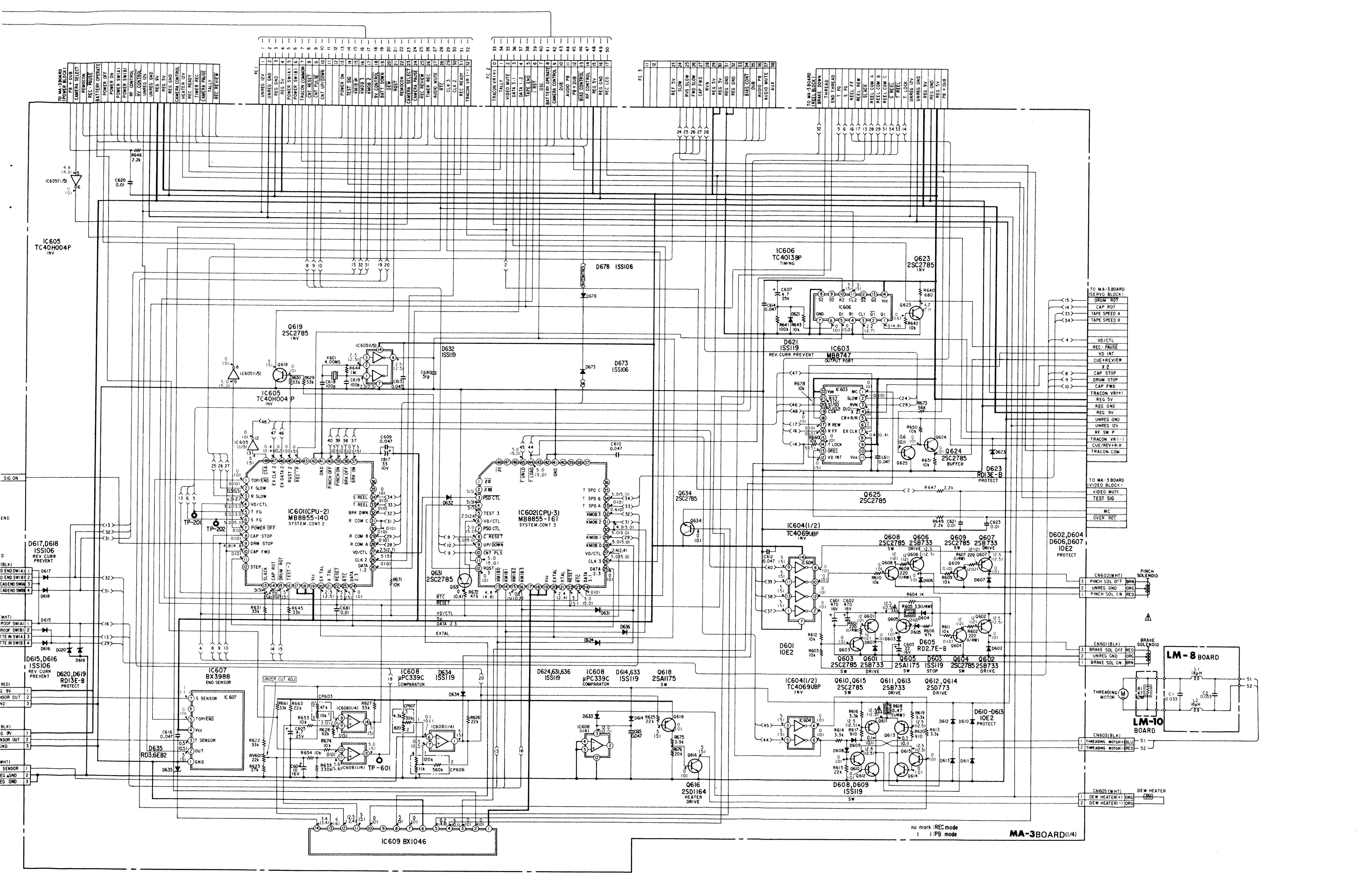
The components identified by shading and ⚠ mark are critical for safety. Replace only with part number specified.

When indicating parts by reference number, please include the board name.

SYSTEM CONTROL SYSTEM CONTROL


A
B
C
D
E
F
G
H
1
2
3
4
5
FR-4 BOARD
-FUNCTION-
no mark: REC mode
( ): PB mode
Q1 2SC2785 DRIVER
D1 PG3432SY POWER
D2 RD3.0E-B STABILIZE
Q4,Q14,Q15 2SC2785 INV
Q13 2SC2021 INV
IC1 (CPU-1) MB8855-139 SYSTEM CONT
Q5 2SC2021 INV
D6,D7,D8,D9 RD13E-B PROTECT
D36 1SS106
Q2 2SC2785 DRIVER
IC2 MB8747B OUTPUT PORT
Q6,Q9,Q10,Q11,Q12 2SC2021 LED DRIVE
Q7,Q8 2SC2785 LED DRIVE
D21,D27 BR3402S DISPLAY
D22,D23,D24 AY3432S DISPLAY
D26 PG3432SY DISPLAY
D25 AA3432S DISPLAY
CN2 (TO LCD)
GND
LCD 3V
LAMP (+)
LAMP (-)
LCD
CN1 (TO LCD)
(NC)
ACL
RESET
CLK
UP/ON
BATTERY
DEW
OPR
LCD 3V
S1 LAMP
LIGHT
IC1
TREC
CSC
Ex CLK1
Ex DOTAL
GND
RTC
CLK3
CLK2
CLK1
R RDY
TALLY
V MUTE
A MUTE
KMOA3
KMOA2
KMOA1
KMOA0
TC
SC/TO
S1
S0
IRQ
IRST
Ex
+B
KMIA0
KMIA1
KMIA2
KMIA3
RRV
C-PSE
CAME
SCO
KOFF
RQST
DEW
BATT-DN
DEW LAMP
9V CONT
BATT OPE
JW2 ALL TEST
JW1 TEST
S3 EJECT
S4 PAUSE
S5 STOP
S9 SLOW MOTION RVS
S8 REW
S7 REC ORD
S13 X1 REV
S10 FF
S11 AUDIO DUB
S15 X1 FWD
S14 PLAY
S6 SLOW MOTION FWD
S12 X2 FWD
IC2
GND
CLK
PSE
REC
FF
PB
REW
EJ
DUB
RF CONT
CAME CONT
A.PB
P+D
B-CONT
STB
DATA
Vcc
PSE
REC
FF
PB
RWD
EJECT
DUB
FC1
TRACON VR(-)
REC READY
CLK2
CLK3
RTC
AUDIO MUTE
TIMER REC
REC REVIEW
CAMERA PAUSE
CAMERA SELECT
REMOCON
RQST
DEW
BATT DOWN
9V CONTROL
KMOB 2
KMOB 3
KMIB0
TEST SIG
POWER ON
CNT UP/DOWN
CNT PULSE
CNT RESET
TRACON COMMON
POWER SW(B)
POWER SW(A)
REG 5V
REG GND
UNREG GND
UNREG 12V
RV1 100k TRACKING
TEST SIG
(OFF) (ON)
S18
R40 10k
MEMORY
CLR
S17
S16
POWER
S2 ON/OFF
TP-1
FC2
TRACON VR(+)
TALLY
VIDEO MUTE
DATA 3,1
DATA 1,2
TAPE END
IRST
OSC
BATTERY OPERATE
CAMERA CONTROL
DUB
AUDIO PB
PB+DUB
BIAS CONTROL
RF CONTROL
REG 5V
REG GND
REC LED
TEST SIG ON
D28 RD18E-B REV CURR PREVENT
D31 1SS119 REV CURR PREVENT
Q3 2SC2785 INV
D29 RD13E-B REV CURR PREVENT
D10,D11,D12,D13,D14,D15,D17 RD13E-B PROTECT
D18,D19 1SS106 REV CURR PREVENT
Q16,Q17,Q18 2SC2021 BUFFER
IC605 TC40H004P INV
UNTHREAD END
THREAD END
D617,D618 1SS106 REV CURR PREVENT
CN607(BLK)
THREAD ENDSW(A)
THREAD END SW(B)
UNTHREAD END SW(A)
UNTHREAD END SW(B)
REC PROOF
CN604(WHT)
REC PROOF SW(A)
REC PROOF SW(B)
CASSETTE IN SW(A)
CASSETTE IN SW(B)
CASSETTE IN
D615,D616 1SS106 REV CURR PREVENT
D620,D619 RD13E-B PROTECT
SUPPLY SENSOR
CN608(RED)
REG 9V
S SENSOR OUT
GND
TAKE-UP SENSOR
CN609(BLK)
REG 9V
T SENSOR OUT
GND
DEW SENSOR
CN606(WHT)
DEW SENSOR
UNREG GND
UNREG GND
TH
TO MA-3 BOARD (POWER BLOCK)
CAMERA SELECT
REMOCON
REC PAUSE
BATTERY OPERATE
POWER OFF
POWER ON
POWER SW(A)
POWER SW(B)
RF CONTROL

SYSTEM CONTROL SYSTEM CONTROL


IC605 TC40H004P INV
IC606 TC4013BP TIMING
Q623 2SC2785 INV
Q619 2SC2785 INV
D632 1SS119
D678 1SS106
D673 1SS106
IC601(CPU-2) MB8855-140 SYSTEM CONT 2
IC602(CPU-3) MB8855-161 SYSTEM CONT 3
D621 1SS119 REV. CURR PREVENT
IC603 MB8747 OUTPUT PORT
Q624 2SC2785 BUFFER
D623 RD13E-B PROTECT
Q625 2SC2785
Q634 2SC2785
Q631 2SC2785
IC604(1/2) TC4069UBP INV
Q608 2SC2785 SW
Q606 2SB733 DRIVE
Q609 2SC2785 SW
Q607 2SB733 DRIVE
D602,D604 D606,D607 10E2 PROTECT
D601 10E2
Q603 2SC2785 SW
Q601 2SB733 DRIVE
Q605 2SA1175 SW
D603 1SS119 STOP
Q604 2SC2785 SW
Q602 2SB733 DRIVE
D605 RD2.7E-B
D617,D618 1SS106 REV CURR PREVENT
D615,D616 1SS106 REV CURR PREVENT
D620,D619 RD13E-B PROTECT
IC607 BX3988 END SENSOR
D635 RD3.6EB2
IC608 μPC339C COMPARATOR
D634 1SS119
D624,631,636 1SS119
IC608 μPC339C COMPARATOR
D614,633 1SS119
Q618 2SA1175
Q616 2SD1164 HEATER DRIVE
IC604(1/2) TC4069UBP INV
Q610,Q615 2SC2785 SW
Q611,Q613 2SB733 DRIVE
Q612,Q614 2SD773 DRIVE
D610-D613 10E2 PROTECT
D608,D609 1SS119 SW
IC609 BX1046
TP-201
TP-202
TP-601
X601 4.00MS
TO MA-3 BOARD (SERVO BLOCK)
TO MA-3 BOARD (VIDEO BLOCK)
CN602(WHT) PINCH SOL OFF UNREG GND PINCH SOL ON
PINCH SOLENOID
CN601(BLK) BRAKE SOL OFF UNREG GND BRAKE SOL ON
BRAKE SOLENOID
LM-8 BOARD
LM-10 BOARD
THREADING MOTOR
CN603(BLK) THREADING MOTOR(+) THREADING MOTOR(-)
CN605(WHT) DEW HEATER(+) DEW HEATER(-)
DEW HEATER
FC-1
FC-2
FC-3
UNDER CUT ADJ

no mark : REC mode
( ) : PB mode

MA-3BOARD(1/4)

LS-8 (AUDIO PROCESS)
— Ref. No. 5000 series —

EH-3 (EARPHONE)
— Ref. No. 8000 series —

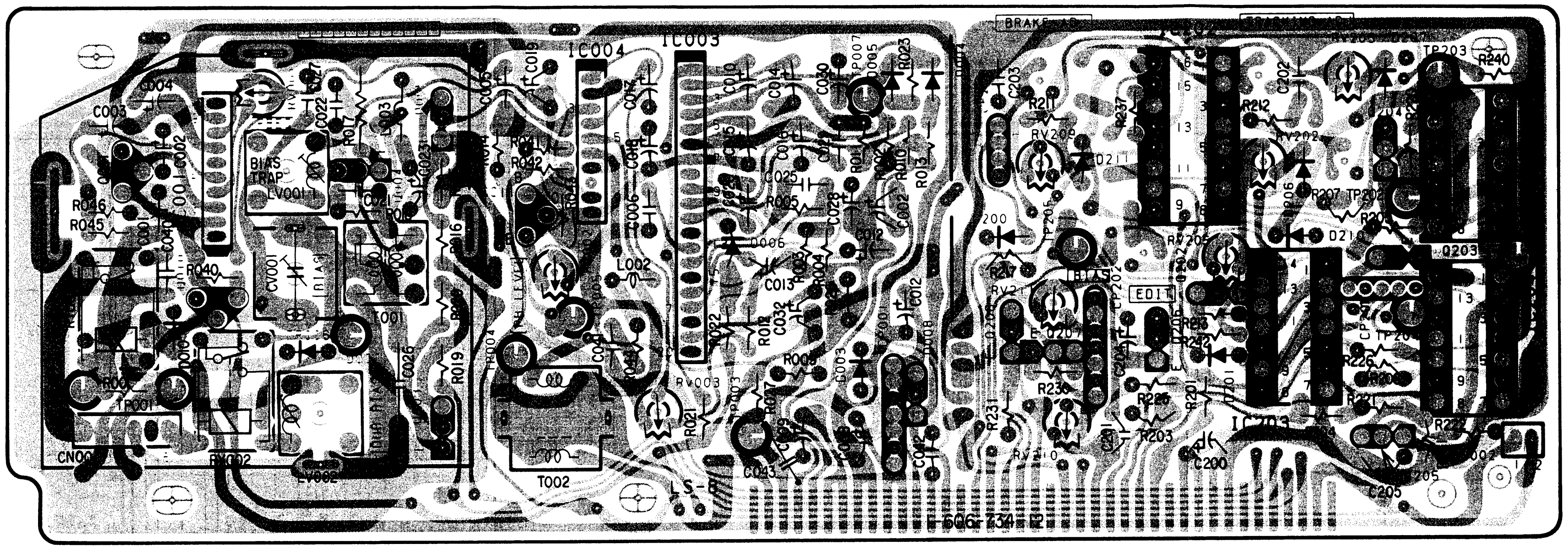
	A	B	C	D	E	F	G	

LS-8 BOARD

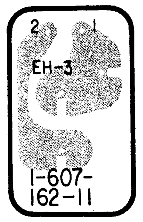
	C	D	E	F	G	
Q, IC	001 IC001 010	004 005 003 011 IC004	IC003 008	208 207 206 IC202 202	IC203 204 205 203 IC201 IC204	Q, IC
D	001	002	006 003 005,004	200 211 201	210 206 207	D
ADJ	RV001,LV001 CV001,LV002	RV002	RV003	RV209 RV210 RV211 RV205	RV202 RV203	ADJ

1

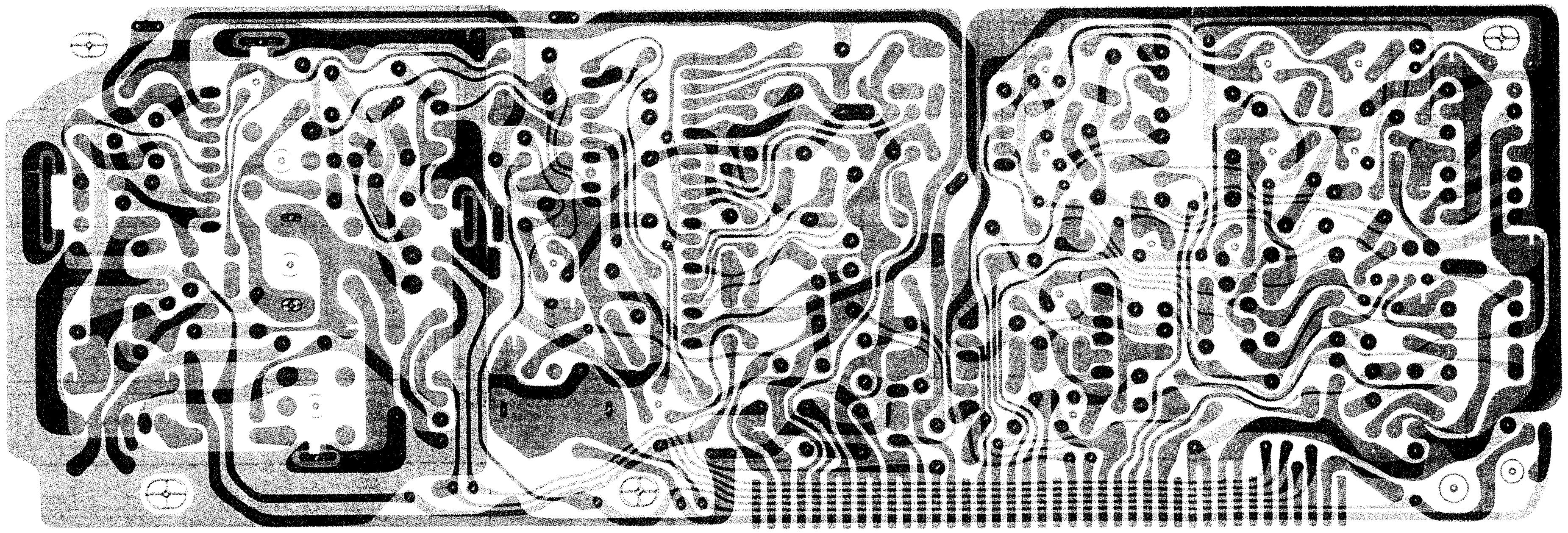
2



EH-3 BOARD

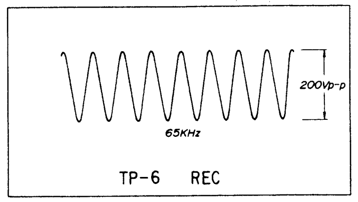


3



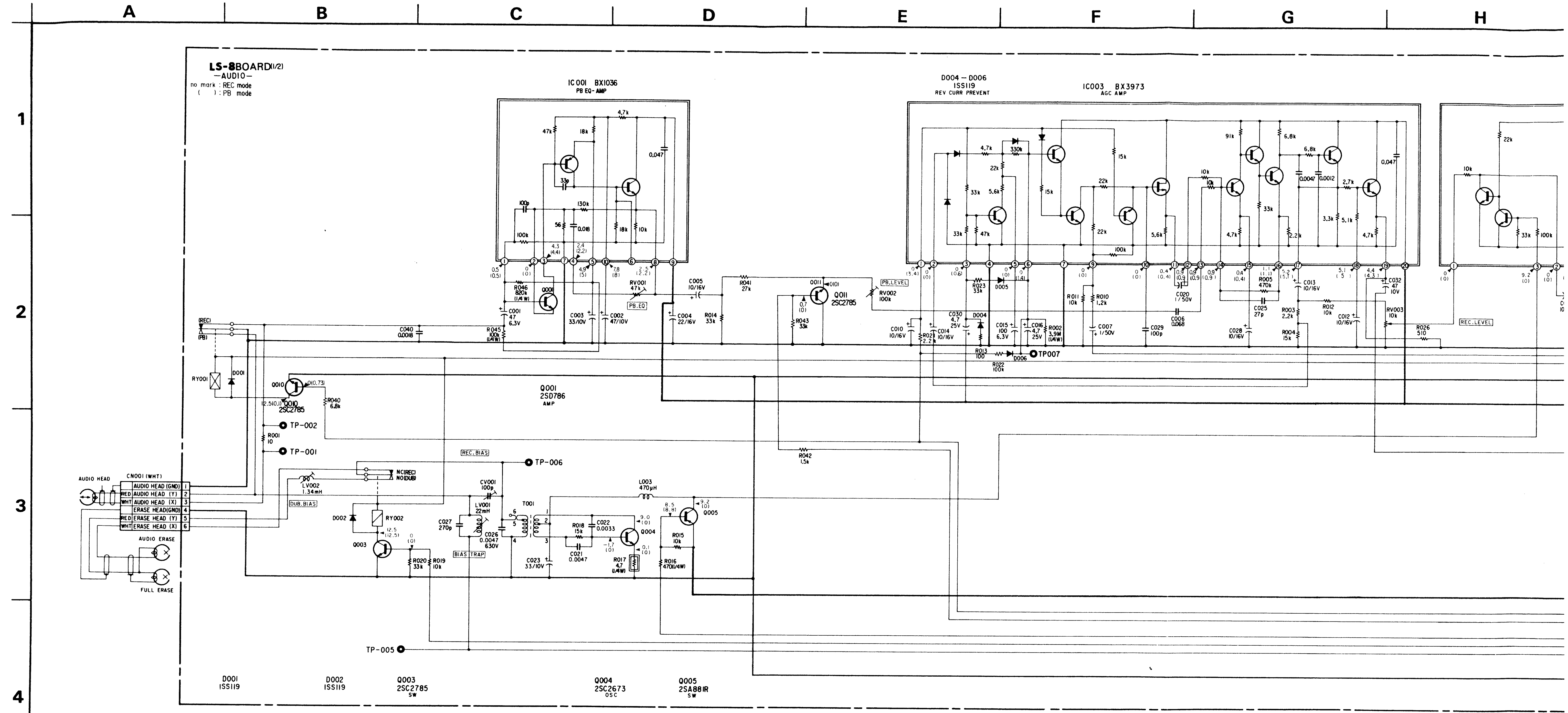
4

LS-8 (AUDIO) BOARD



TP-6 REC

5

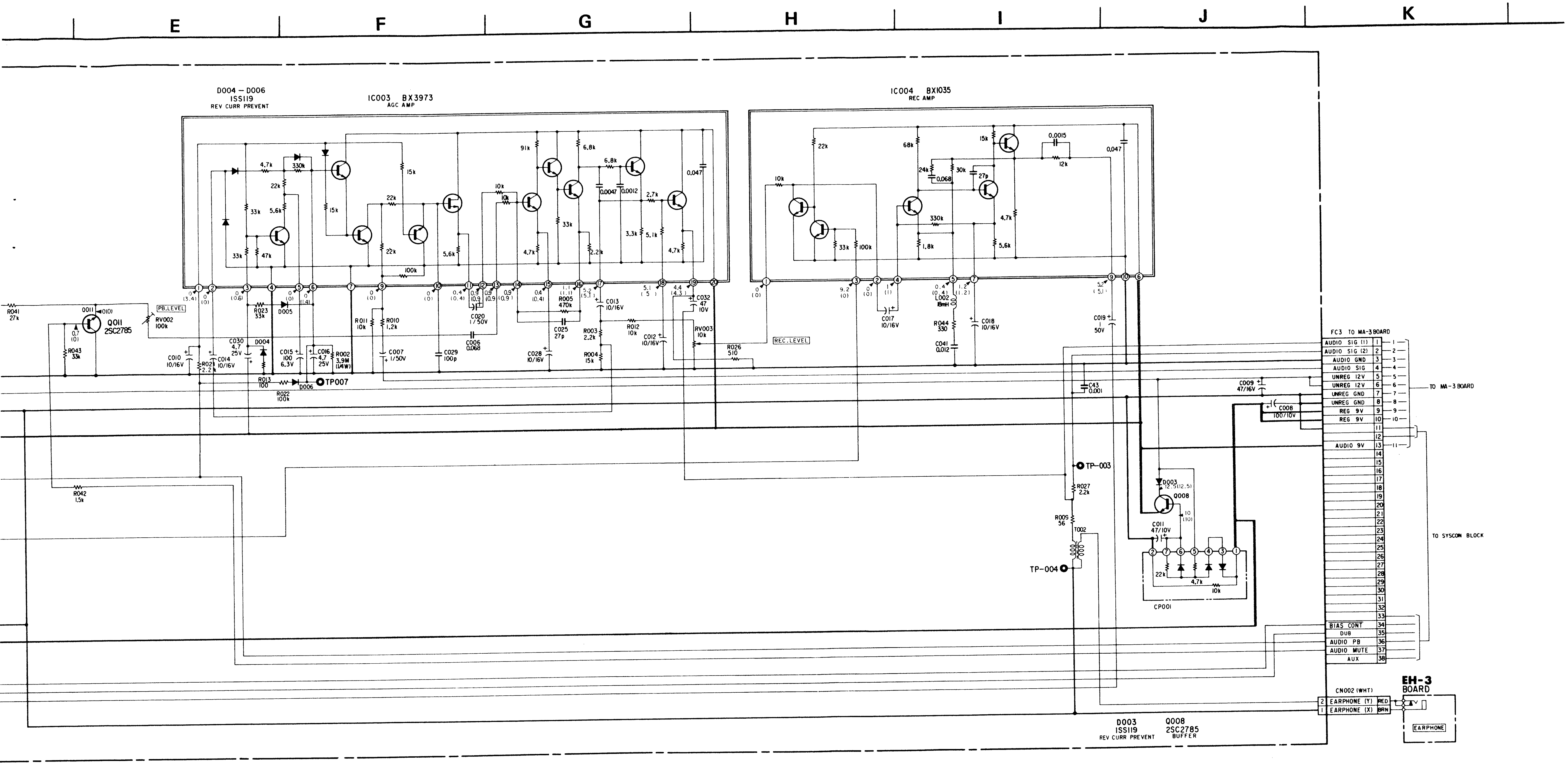

A
B
C
D
E
F
G
H
1
2
3
4
LS-8 BOARD (1/2)
—AUDIO—
no mark : REC mode
( ) : PB mode
IC001 BX1036
PB EQ-AMP
D004 – D006
1SS119
REV CURR PREVENT
IC003 BX3973
AGC AMP
RV001 47k
PB.EQ
R046 820k (1/4W)
C001 47 6.3V
R045 100k (1/4W)
C040 0.0018
C003 33/10V
C002 47/10V
C005 10/16V
C004 22/16V
R014 33k
R041 27k
Q011 2SC2785
R043 33k
R042 1.5k
PB.LEVEL
RV002 100k
C010 10/16V
R021 2.2k
C014 10/16V
C030 4.7 25V
D004
R023 33k
D005
R013 100
D006
TP007
R022 100k
C015 100 6.3V
C016 4.7 25V
R002 3.9M (1/4W)
R011 10k
R010 1.2k
C007 1/50V
C029 100p
C006 0.068
C020 1/50V
C025 27p
R005 470k
C028 10/16V
R003 2.2k
R004 15k
C013 10/16V
R012 10k
C012 10/16V
C032 47 10V
RV003 10k
REC.LEVEL
R026 510
(REC)
(PB)
RY001
D001
Q010 2SC2785
R040 6.8k
Q001 2SD786 AMP
TP-002
R001 10
TP-001
REC.BIAS
TP-006
NC(REC)
NO(DUB)
LV002 1.34mH
DUB.BIAS
D002
RY002
Q003
R020 33k
R019 10k
CV001 100p
LV001 22mH
C027 270p
C026 0.0047 630V
BIAS TRAP
T001
C023 33/10V
R018 15k
C021 0.0047
C022 0.0033
Q004
R017 4.7 (1/4W)
L003 470μH
Q005
R015 10k
R016 470Ω(1/4W)
TP-005
AUDIO HEAD
CN001 (WHT)
AUDIO HEAD (GND) 1
RED AUDIO HEAD (Y) 2
WHT AUDIO HEAD (X) 3
ERASE HEAD (GND) 4
RED ERASE HEAD (Y) 5
WHT ERASE HEAD (X) 6
AUDIO ERASE
FULL ERASE
D001 1SS119
D002 1SS119
Q003 2SC2785 SW
Q004 2SC2673 OSC
Q005 2SA881R SW

NOTES:

- All resistors are in ohms, 1/8W unless otherwise noted. kΩ = 1000Ω; MΩ = 1000kΩ
- All capacitors are in μF unless otherwise noted. p : μμF 50WV or less are not indicated except for electrolytics.
- All variable and adjustable resistors have characteristic curve B, unless otherwise noted.
- —[⩘⩘]— : nonflammable resistor.
- The red lines show the main voltages.
- Marked * is not able to measure the voltage of it's position.
- All voltages are dc measured with a DMT (1MΩ/V).

The components identified by shading and ⚠ mark are critical for safety. Replace only with part number specified.

When indicating parts by reference number, please include the board name.

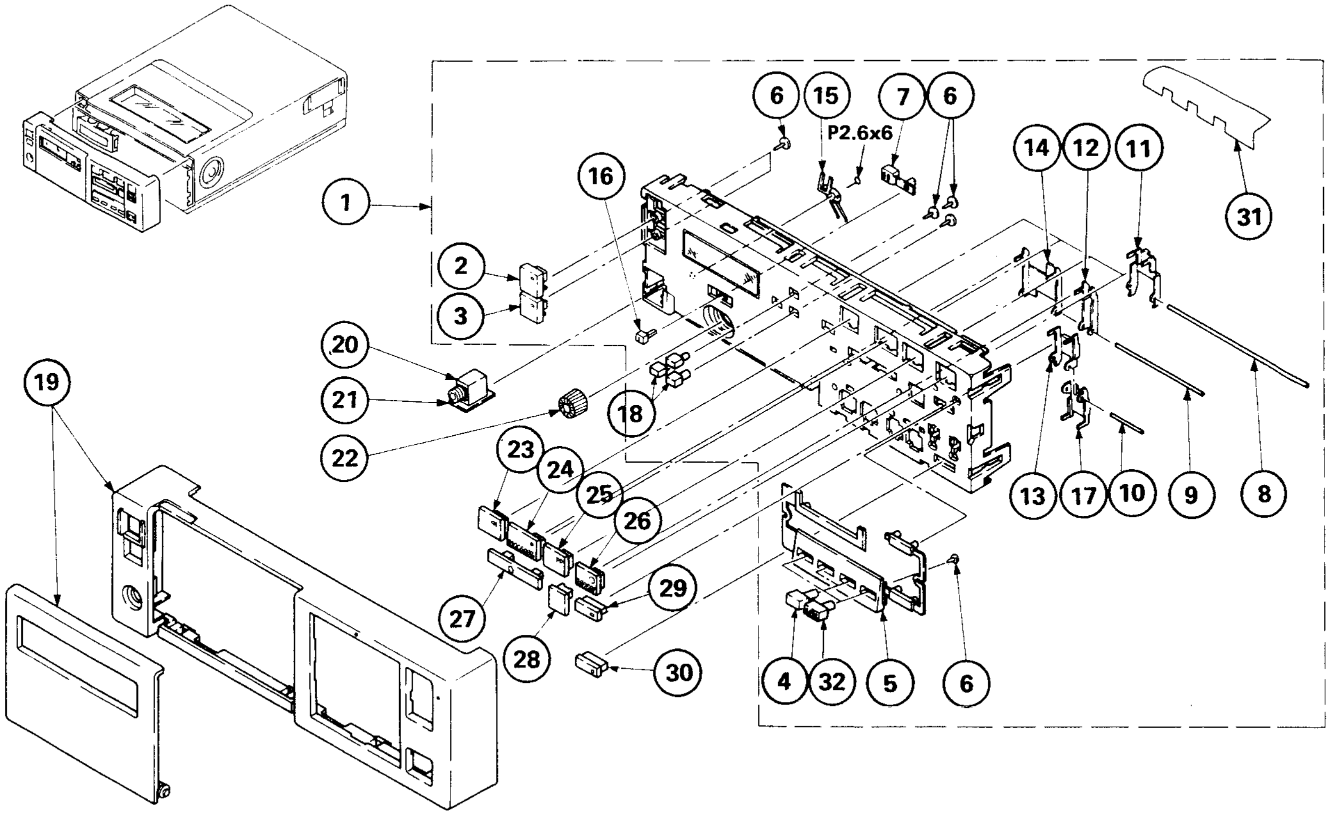

E
F
G
H
I
J
K
D004 – D006
1SS119
REV CURR PREVENT
IC003 BX3973
AGC AMP
IC004 BX1035
REC AMP
Q011
2SC2785
R041 27k
R043 33k
R042 1.5k
PB.LEVEL
RV002 100k
C010 10/16V
R021 2.2k
C014 10/16V
C030 4.7 25V
D004
R023 33k
D005
C015 100 6.3V
C016 4.7 25V
R002 3.9M (1/4W)
R013 100
R022 100k
D006
TP007
R011 10k
R010 1.2k
C007 1/50V
C029 100p
C020 1/50V
C006 0.068
C025 27p
R005 470k
C028 10/16V
R003 2.2k
R004 15k
C013 10/16V
R012 10k
C012 10/16V
C032 47 10V
RV003 10k
R026 510
REC.LEVEL
C017 10/16V
L002 18mH
R044 330
C041 0.012
C018 10/16V
C019 1 50V
C43 0.001
C009 47/16V
C008 100/10V
TP-003
R027 2.2k
R009 56
T002
TP-004
D003
Q008
C011 47/10V
CP001
FC3 TO MA-3 BOARD
AUDIO SIG (1) 1
AUDIO SIG (2) 2
AUDIO GND 3
AUDIO SIG 4
UNREG 12V 5
UNREG 12V 6
UNREG GND 7
UNREG GND 8
REG 9V 9
REG 9V 10
11
12
AUDIO 9V 13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
BIAS CONT 34
DUB 35
AUDIO PB 36
AUDIO MUTE 37
AUX 38
TO MA-3 BOARD
TO SYSCON BLOCK
CN002 (WHT)
2 EARPHONE (Y) RED
1 EARPHONE (X) BRN
EH-3 BOARD
EARPHONE
D003
1SS119
REV CURR PREVENT
Q008
2SC2785
BUFFER

SECTION 4
EXPLODED VIEWS

NOTE:
- Items with no part number and no description are not stocked because they are seldom required for routine service.
- The construction parts of an assembled part are indicated with a collation number in the remark column.
- As to the part numbered with E-, refer to the electrical parts list.
- Items marked " ♦ " are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.

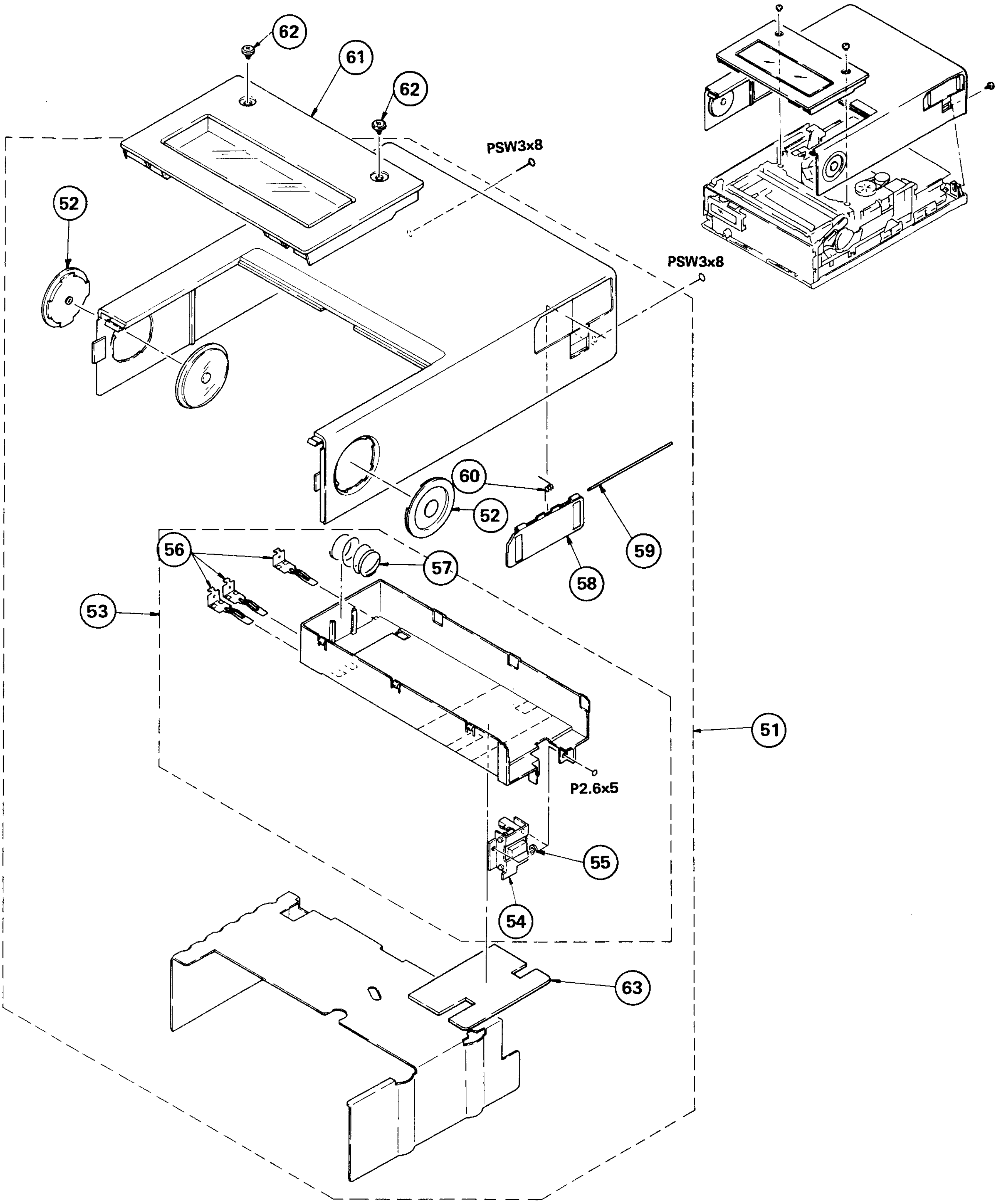
The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.

(1) FRONT PANEL ASSEMBLY



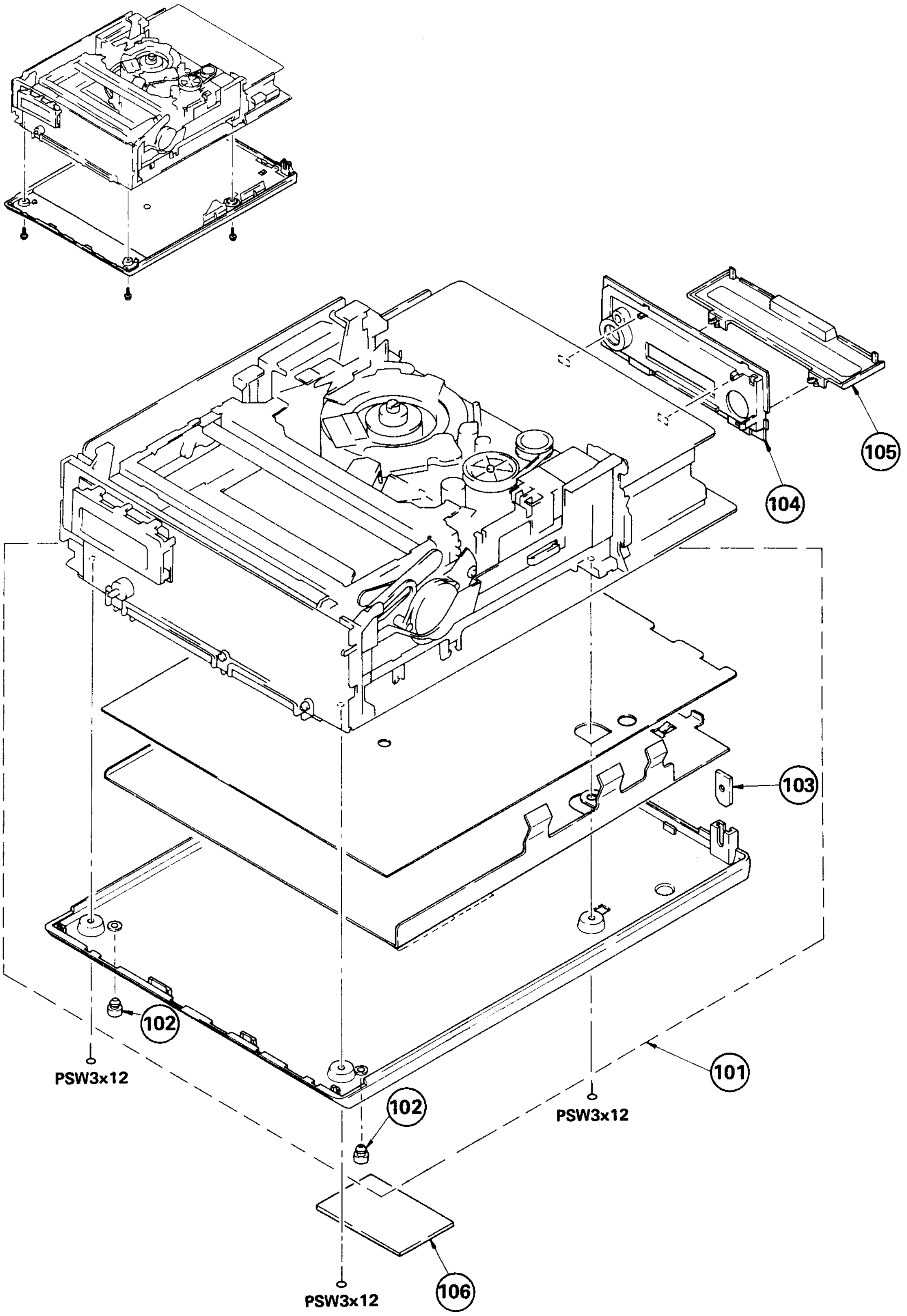
No.	Part No	Description	Remark
1	X-3672-306-0	CABINET ASSY, FRONT	2---18,31,32
2	X-3669-337-0	BUTTON ASSY, PW	
3	X-3669-338-0	BUTTON ASSY, EJ	
4	3-669-492-00	BUTTON (A), F	
5	3-669-553-11	PANEL, SUB, FRONT	
6	3-669-662-00	CAP (A), BUTTON	
7	3-669-495-00	SLIDER, SWITCH	
8	♦:3-669-498-00	SHAFT (A)	
9	♦:3-669-499-00	SHAFT (B)	
10	♦:3-669-500-00	SHAFT (C)	
11	♦:3-669-501-00	ARM (A), BUTTON	
12	♦:3-669-502-00	ARM (B), BUTTON	
13	♦:3-669-503-00	ARM (C), BUTTON	
14	♦:3-669-504-00	ARM (D), BUTTON	
15	3-669-512-00	SPRING, LEAF	
16	3-669-529-00	KNOB, SLIDE SWITCH	
17	3-669-611-00	ARM (E), BUTTOM	
18	3-669-497-00	BUTTON, LCD	
19	A-6703-195-A	PANEL ASSY, FRONT	
20	1-507-251-XX	JACK	
21	♦:1-607-162-00	EH-3 BOARD	
22	3-669-511-00	KNOB, TRACK CONTROL	
23	X-3669-339-0	BUTTON ASSY, REW	
24	X-3669-340-0	BUTTON ASSY, PLAY	
25	X-3669-341-0	BUTTON ASSY, FF	
26	X-3669-342-0	BUTTON ASSY, REC	
27	3-669-563-00	BUTTON, STOP	
28	3-669-554-00	BUTTON (B), F	
29	X-3669-343-0	BUTTON ASSY, PD	
30	X-3669-348-0	BUTTON ASSY, PAUSE	
31	3-669-661-00	COVER, LED	
32	3-672-520-00	BUTTON (C), F	

(2) UPPER PANEL ASSEMBLY


62
61
62
PSW3x8
52
PSW3x8
60
52
59
56
57
58
53
51
P2.6x5
55
54
63

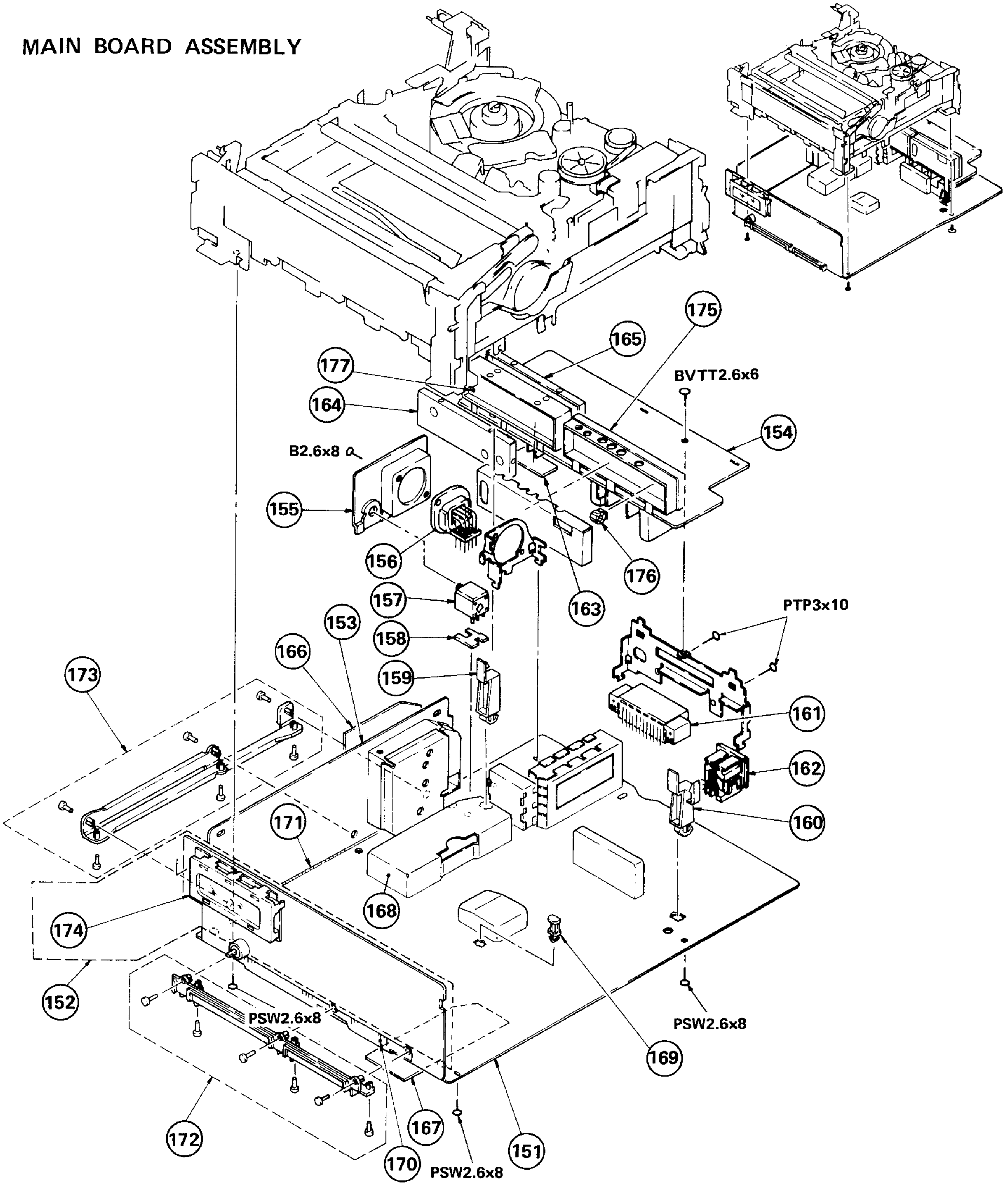
No.	Part No	Description	Remark
51	X-3672-304-0	CABINET (UPPER) ASSY	52---60,63
52	X-3669-349-0	BRACKET ASSY, HANDLE	
53	X-3669-362-0	CASE ASSY, BATTERY	54,55,56,57
54	X-3669-361-0	LOCK BLOCK ASSY, BATTERY	55
55	3-559-408-00	POLY-WASHER, 1.2 DIA	
56	3-672-532-00	TERMINAL (A)	
57	3-669-594-00	SPRING, COMPRESSION	
58	3-669-517-41	LID, BATTERY CASE	
59	♦:3-669-521-00	SHAFT (B)	
60	3-669-592-00	SPRING (A), TORSION	
61	X-3672-303-0	COVER ASSY	
62	3-669-403-00	SCREW, ORNAMENTAL	
63	♦:3-672-329-00	INSULATOR (B)	

(3) LOWER PANEL ASSEMBLY


105
104
103
102
PSW3x12
101
102
PSW3x12
PSW3x12
106

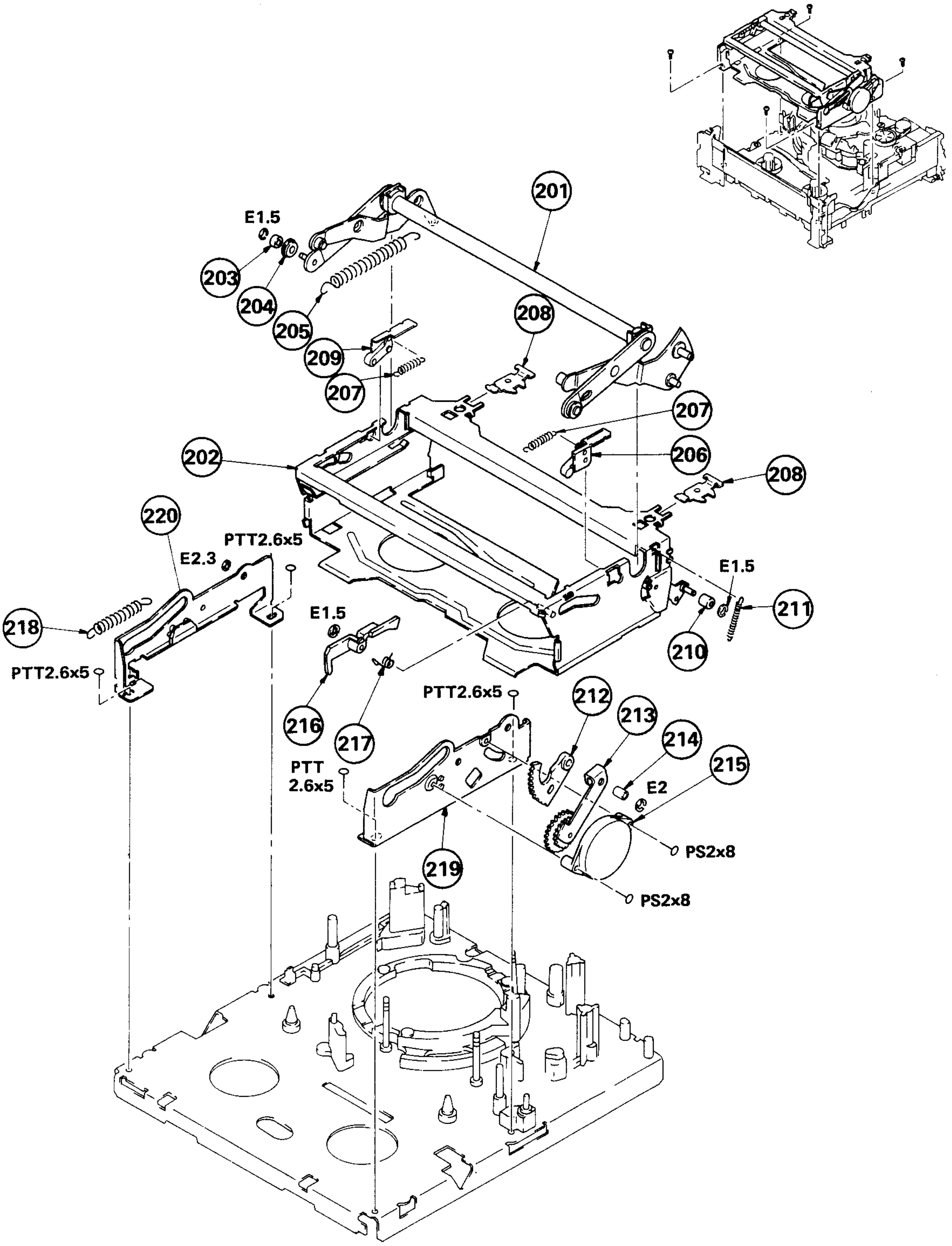
No.	Part No	Description	Remark
101	X-3672-305-0	CABINET (LOWER) ASSY	102,103
102	3-669-527-00	LEG, RUBBER	
103	3-669-518-00	NUT, CABINET	
104	3-672-313-02	PANEL, REAR	
105	X-3672-302-0	LID ASSY, PANEL, CONNECTOR	
106	♦:3-672-302-00	LABEL, MODEL NUMBER (AEP)	

(4) MAIN BOARD ASSEMBLY


175
165
177
BVTT2.6x6
164
154
B2.6x8
155
156
176
163
157
PTP3x10
153
158
166
159
173
161
162
160
171
168
174
152
PSW2.6x8
PSW2.6x8
169
172
167
170
151
PSW2.6x8

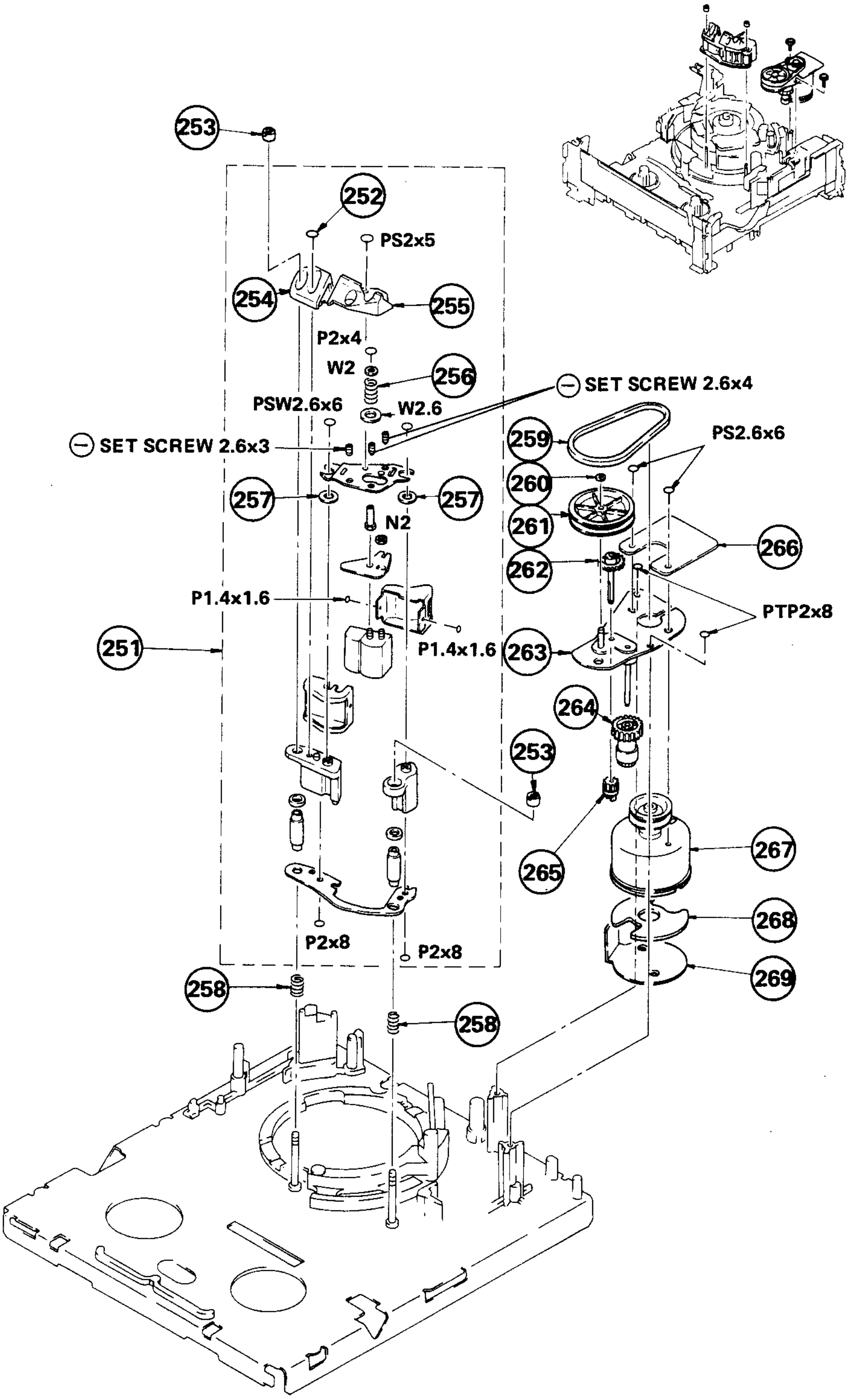
No.	Part No	Description	Remark
151	♦:A-6715-140-A	MA-3 BOARD, COMPLETE	
152	♦:A-6717-251-A	FR-4 BOARD, COMPLETE	
153	♦:A-6713-123-A	LS-8 BOARD, COMPLETE	
154	♦:A-6711-326-A	SF-5 BOARD, COMPLETE	
155	3-669-570-31	PANEL, ORNAMENTAL, CONNECTOR	
156	1-561-690-00	CONNECTOR, CAMERA 14P	
157	1-507-285-00	JACK	
158	♦:3-669-513-00	SPACER, MICROPHONE JACK	
159	♦:3-672-310-00	FOOT (LEFT), SF	
160	♦:3-672-311-00	FOOT (RIGHT), SF	
161	1-561-684-00	CONNECTOR, RECEPTACLE, 26P	
162	♦:1-561-717-00	CONNECTOR, 5P	
163	♦:1-606-731-00	SL-3 BOARD	
164	♦:3-672-321-00	CASE (D), SHIELD	
165	♦:3-672-320-00	CASE (E), SHIELD	
166	♦:X-3669-367-0	LID ASSY, REAR, SHIELD CASE	
167	♦:X-3669-372-0	PLATE ASSY, REAR, SHIELD CASE	
168	♦:X-3669-373-0	CASE (MAIN) ASSY, SHIELD, MA-S	
169	♦:3-669-610-00	SPACER	
170	1-605-077-00	FC-1 BOARD	
171	1-605-078-00	FC-3 BOARD	
172	♦:3-669-565-00	HINGE (FR), CHASSIS	
173	♦:3-369-582-00	HINGE (MA), PC BOARD	
174	1-548-562-00	COUNTER MODULE, TAPE	
175	1-464-186-00	RP BLOCK (RP-1-P-2)	
176	1-427-521-00	TRANSFORMER	
177	♦:1-606-730-00	SF-6 BOARD	

(5) CASSETTE COMPARTMENT ASSEMBLY


201
E1.5
203
204
205
208
209
207
207
206
202
208
220
PTT2.6x5
E2.3
E1.5
211
218
E1.5
210
PTT2.6x5
PTT2.6x5
212
213
214
216
217
215
PTT 2.6x5
E2
PS2x8
219
PS2x8

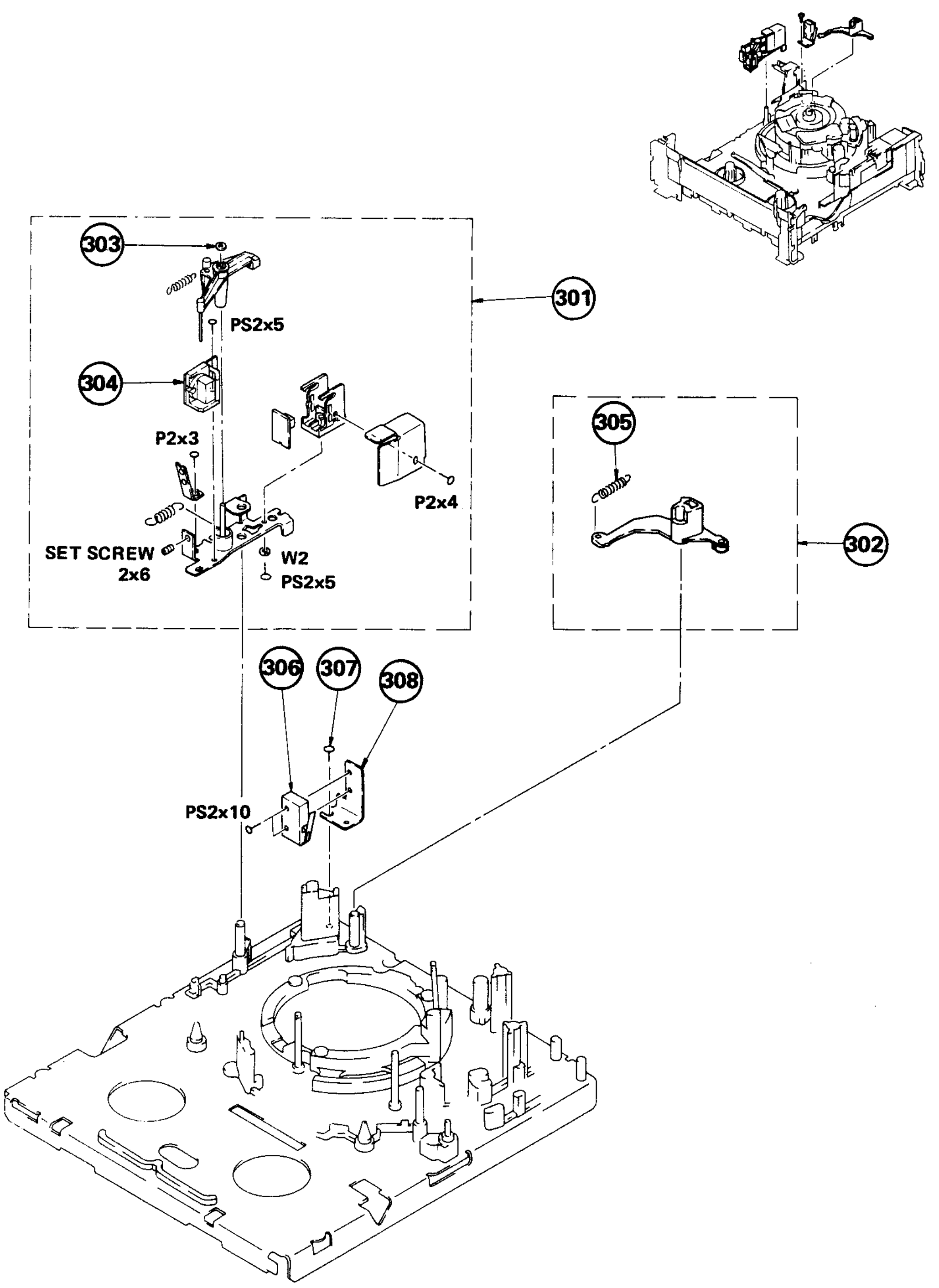
No.	Part No	Description	Remark
201	X-3669-356-0	ARM SUB ASSY	205
202	X-3669-357-0	HOLDER ASSY, CASSETTE	208,210,211
203	3-669-380-00	ROLLER, CLICK	
204	3-669-375-00	ROLLER (R1), ARM	
205	3-669-379-00	SPRING, TENSION	
206	●:X-3669-335-0	STOPPER (R) ASSY, BEARING	207
207	3-669-386-00	SPRING, TENSION	
208	●:3-669-423-00	STOPPER, COVER	
209	●:X-3669-334-0	STOPPER (L) ASSY, BEARING	207
210	3-669-381-00	ROLLER, OPEN, LID	
211	3-570-898-00	SPRING, TENSION	
212	3-669-367-00	GEAR, FAN	
213	X-3669-332-0	GEAR ASSY, MIDWAY	
214	3-661-588-00	SPACER	
215	X-3669-333-0	DAMPER ASSY	
216	3-669-368-00	STOPPER, CASSETTE	
217	3-669-405-00	SPRING, TORSION	
218	3-534-902-00	SPRING, TENSION	
219	●:X-3669-358-0	SUPPORT (R) ASSY	
220	●:X-3669-359-0	SUPPORT (L) ASSY	218

(6) THREADING MOTOR AND ACE HEAD ASSEMBLY


253
252
PS2x5
254
255
P2x4
W2
256
PSW2.6x6
W2.6
SET SCREW 2.6x4
SET SCREW 2.6x3
259
PS2.6x6
260
257
257
N2
261
266
262
P1.4x1.6
PTP2x8
251
P1.4x1.6
263
264
253
267
265
268
P2x8
P2x8
269
258
258

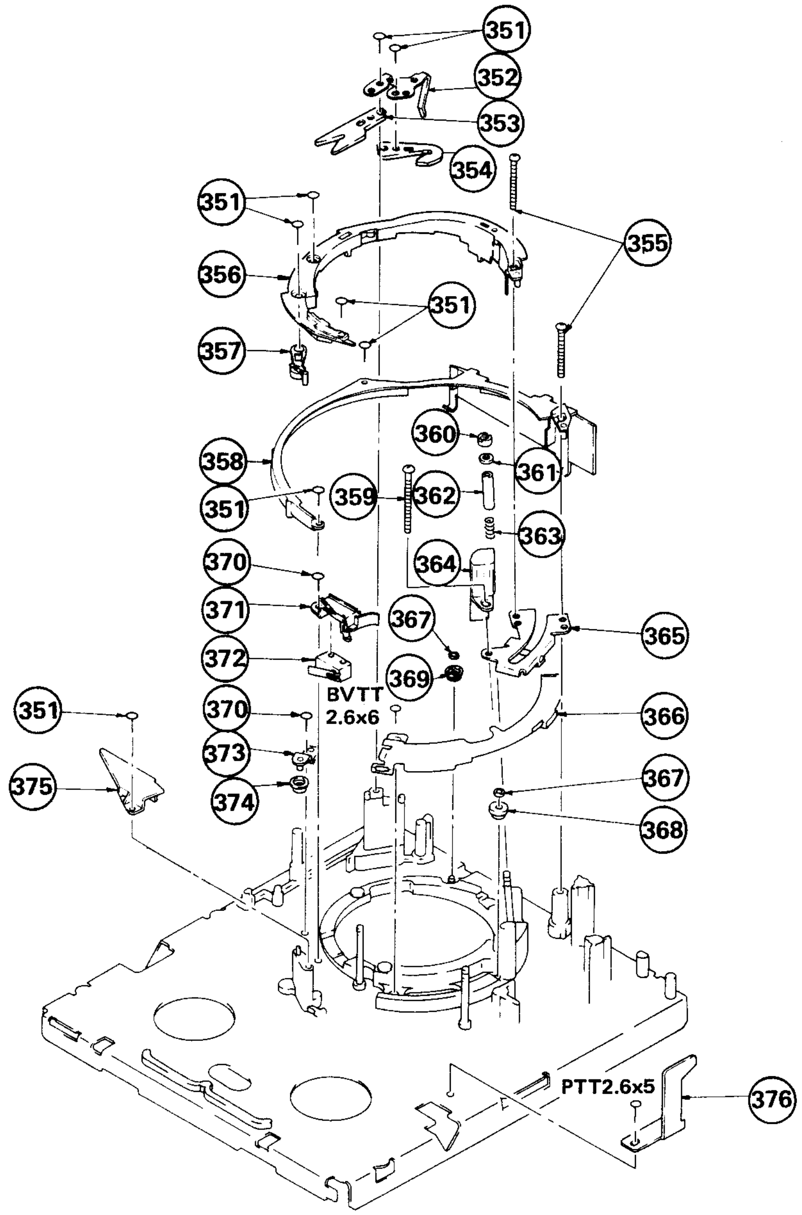
No.	Part No	Description	Remark
251	A-6761-045-A	ACE ASSY (M-3)	254---257
252	3-669-480-00	+ PTPWH 2	
253	3-669-318-00	NUT, ADJUSTMENT, GUIDE	
254	●:3-669-537-00	SLOPE (LEFT)	
255	●:3-669-541-00	SLOPE (RIGHT)	
256	●:3-669-316-00	SPRING, COMPRESSION	
257	3-669-598-00	WASHER, CTL	
258	3-669-317-00	SPRING, COMPRESSION	
259	3-669-327-00	BELT, RUBBER	
260	3-669-465-00	WASHER (1.5), STOPPER	
261	3-669-328-02	PULLEY, GEAR	
262	3-669-332-00	GEAR (BA)	
263	X-3669-324-3	CHASSIS ASSY, MOTOR, L	
264	X-3669-321-0	GEAR (C) ASSY	
265	3-669-333-00	GEAR (BC)	
266	●:1-605-664-00	LM-10 BOARD	
267	A-6737-090-A	MOTOR ASSY, L	
268	●:1-605-071-00	LM-8 BOARD	
269	●:3-669-613-00	INSULATOR, L MOTOR	

(7) LOCK ARM AND TP ASSEMBLY


303
PS2x5
304
P2x3
SET SCREW
2x6
W2
PS2x5
P2x4
301
305
302
306
307
308
PS2x10

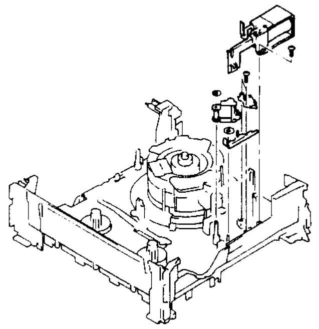
No.	Part No	Description	Remark
301	A-6742-032-A	TP ASSY	303,304
302	X-3669-351-0	ARM ASSY, LOCK	
303	3-669-465-00	WASHER (1.5), STOPPER	
304	1-235-054-00	COIL, SENSOR, S	
305	3-531-860-00	SPRING, TENSION	
306	1-552-664-00	SWITCH, MICRO	
307	3-669-607-00	+PSW (SMALL ROUND) 2.6	
308	♠:3-669-354-00	BRACKET, SWITCH, LE	

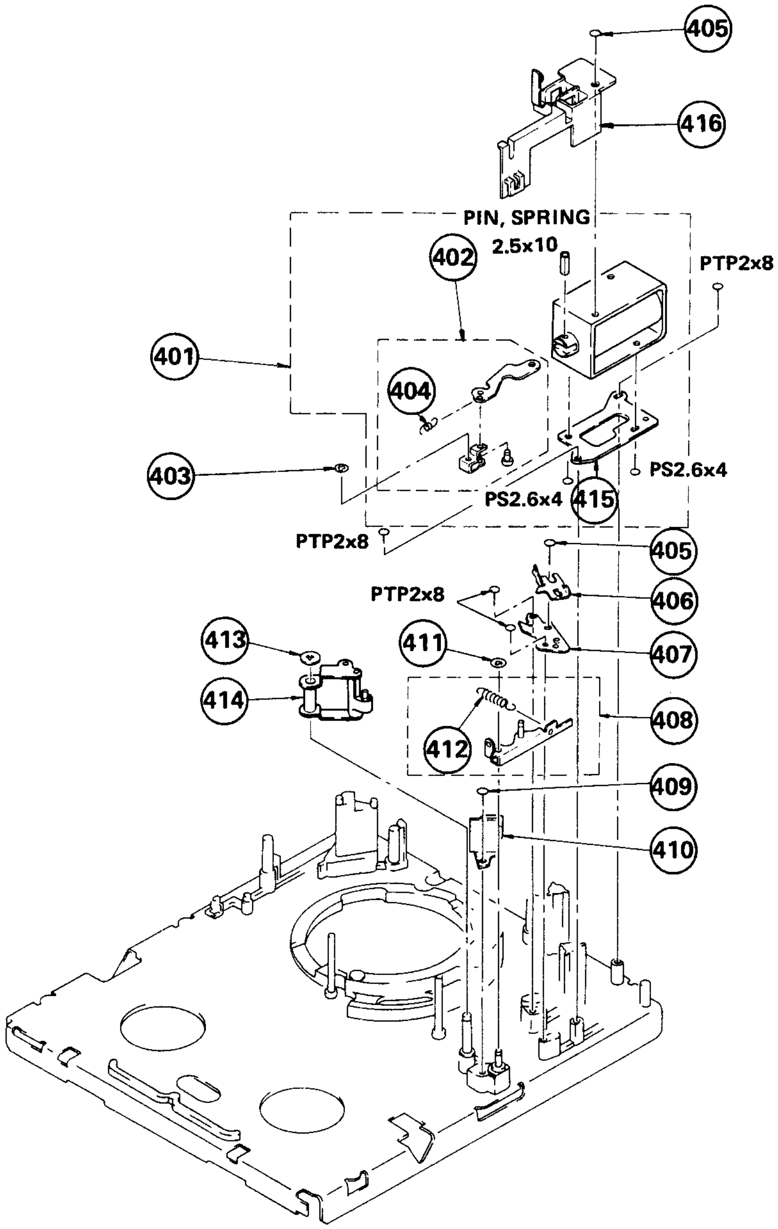
(8) ULE SWITCH AND SHUTTLE GUIDE ASSEMBLY


351
352
353
354
355
351
356
351
357
360
361
358
359
362
351
363
370
364
371
367
365
372
369
BVTT
2.6x6
351
370
366
373
367
375
374
368
PTT2.6x5
376

No.	Part No	Description	Remark
351	3-669-480-11	+ PTPWH 2	
352	♦:3-669-621-00	PLATE, GROUND, TAPE GUIDE	
353	♦:3-669-618-00	PLATE (2), ADJUST	
354	♦:3-672-507-00	PLATE (3-1), ADJUSTMENT	
355	3-669-466-00	SCREW (M 2.6)	
356	♦:3-669-584-00	GUIDE (1), SHUTTLE	
357	X-3669-327-0	ARM ASSY, SWITCH, ULE	
358	♦:3-669-585-00	GUIDE (2), SHUTTLE	
359	3-669-606-00	SCREW (2.6)	
360	3-669-446-00	NUT, GUIDE, NO. 6	
361	3-669-447-00	FLANGE, GUIDE, NO. 6	
362	3-669-445-00	SPACER, GUIDE, NO. 6	
363	3-669-615-00	SPRING, COMPRESSION	
364	8-825-508-10	HEAD, FE	
365	♦:X-3669-313-0	BASE ASSY, SLANT	
366	♦:3-669-477-00	LINER, LINK, PIN	
367	3-669-465-00	WASHER (1.5), STOPPER	
368	3-669-597-00	ROLLER (B), RING	
369	3-669-630-00	ROLLER (C), RING	
370	3-669-607-11	+PSW (SMALL ROUND) (2.6)	
371	♦:3-669-355-00	HOLDER, SWITCH, ULE	
372	1-553-718-00	SWITCH, MICRO	
373	♦:X-3669-329-0	PLATE ASSY, ADJUSTMENT	
374	3-669-360-00	ROLLER, RING	
375	♦:3-669-476-04	PLATE, GUIDE	
376	♦:3-669-484-00	BRACKET, OPEN, LID	

(9) PINCH ROLLER SOLENOID ASSEMBLY

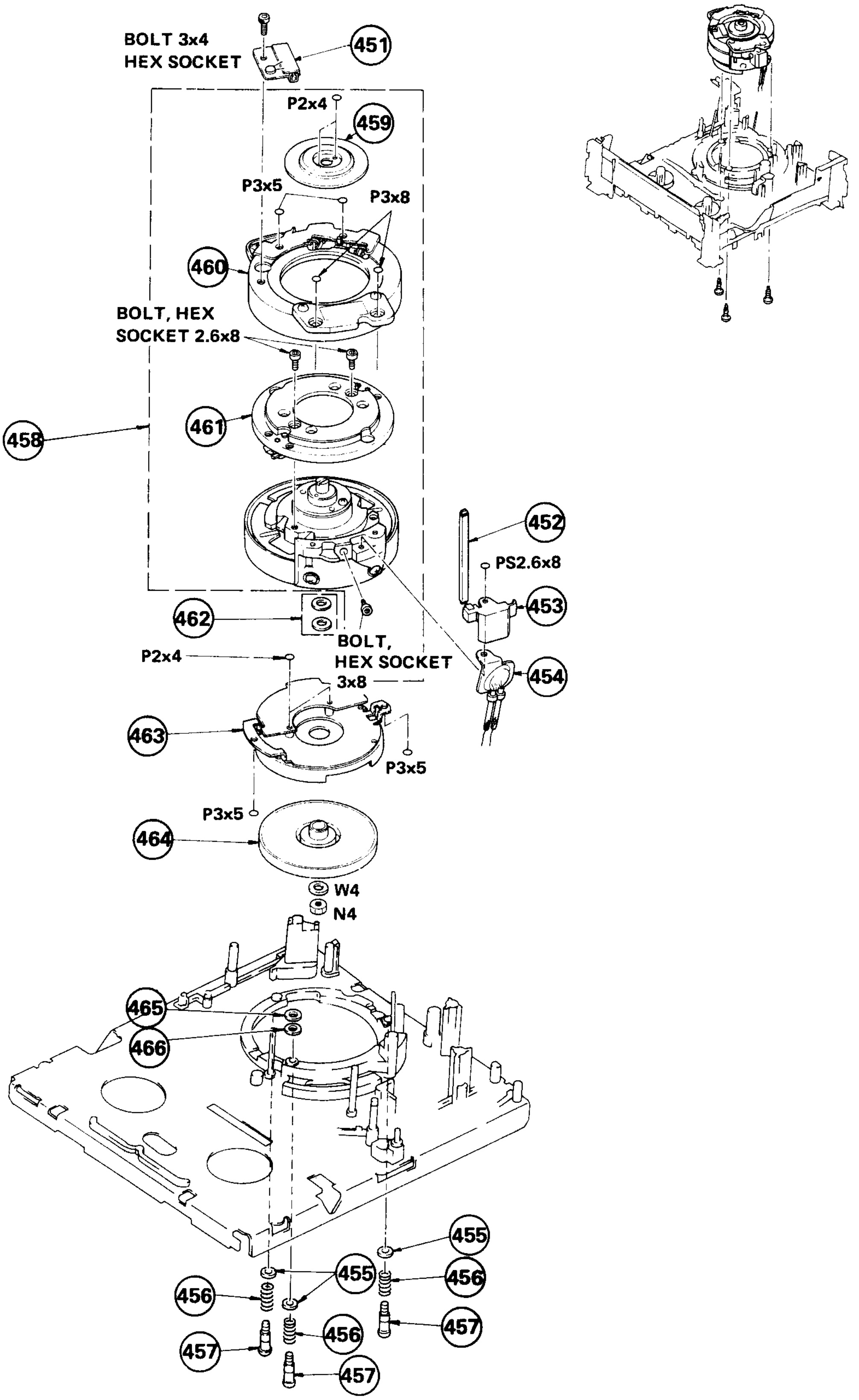



405
416
PIN, SPRING
2.5x10
402
PTP2x8
401
404
403
PS2.6x4
PS2.6x4
415
PTP2x8
405
PTP2x8
406
413
411
407
414
408
412
409
410

No.	Part No	Description	Remark
401	⚠.A-6749-058-A	SOLENOID BLOCK ASSY, PINCH	402,404,415
402	X-3669-365-0	ARM ASSY, PINCH SOLENOID	404
403	3-669-465-00	WASHER (1.5), STOPPER	
404	3-669-440-00	SPRING, TENSION	
405	3-669-607-11	+PSW (SMALL ROUND) (2.6)	
406	•:3-669-462-00	PLATE, ADJUSTMENT, LIMITER, PINCH	
407	•:3-669-349-00	PLATE, LOCK, T	
408	•:X-3669-379-0	ARM (P) ASSY, PINCH LIMITER	412
409	3-669-480-11	+ PTPWH 2	
410	1-235-055-00	COIL SENSOR, T	
411	3-669-595-00	WASHER (2), STOPPER	
412	3-465-159-XX	SPRING, TENSION	
413	3-669-596-00	WASHER (2.3), STOPPER	
414	•:X-3669-309-4	ARM ASSY, PRESS, PINCH	
415	•:3-669-459-00	BRACKET, SOLENOID	
416	•:3-669-612-00	CLAMP (A), HARNESS	

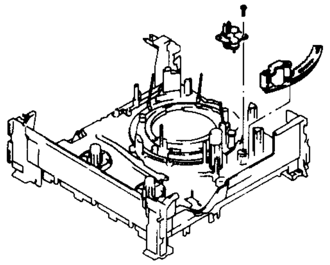
The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.

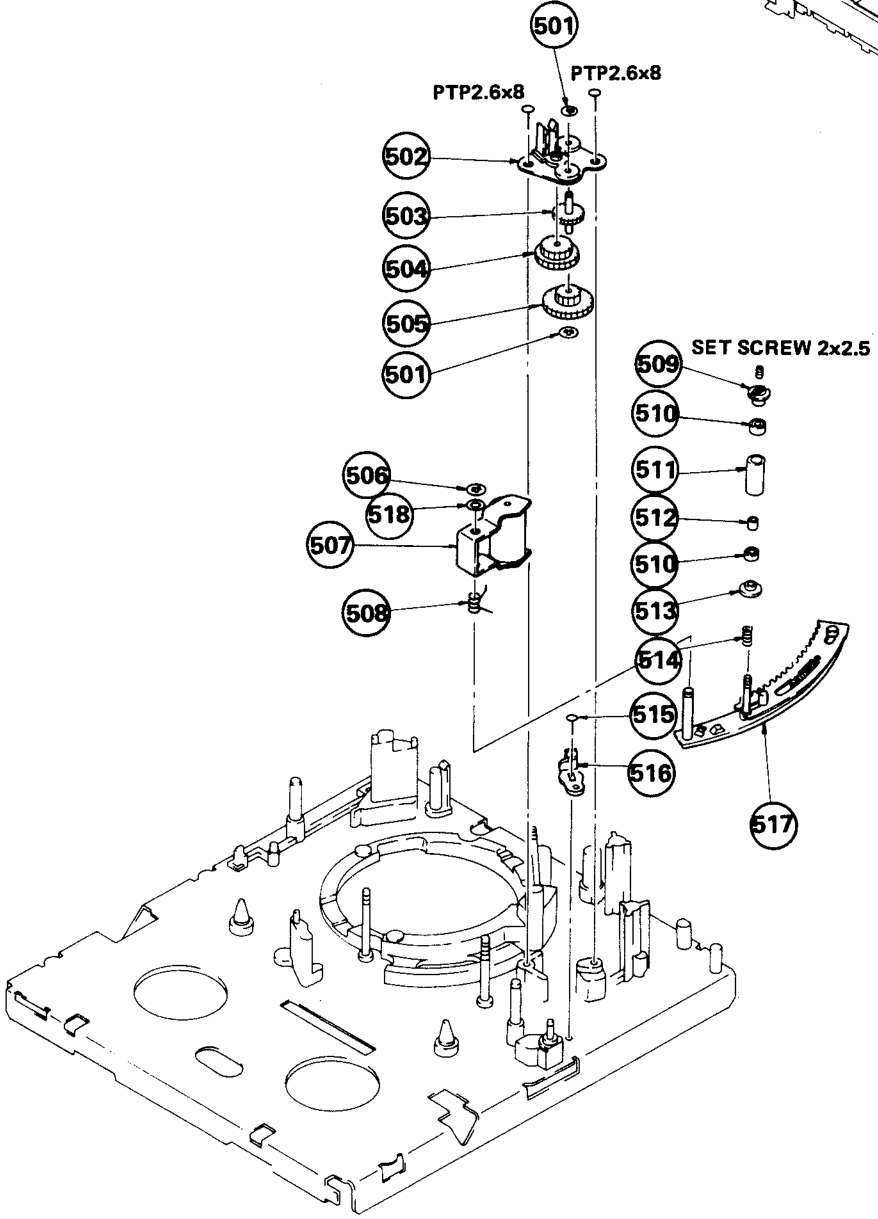
(10) DRUM ASSEMBLY


BOLT 3x4
HEX SOCKET
451
P2x4
459
P3x5
P3x8
460
BOLT, HEX
SOCKET 2.6x8
461
458
452
PS2.6x8
453
462
BOLT,
HEX SOCKET
3x8
454
P2x4
463
P3x5
P3x5
464
W4
N4
465
466
455
455
456
456
456
457
457
457

No.	Part No	Description	Remark
451	1-806-354-00	SENSOR, DEW CONDENSATION	
452	♠:X-3669-381-0	STAY ASSY	
453	♠:X-3669-380-0	COVER ASSY, HEATER	
454	1-446-961-00	HEATER, PTC	
455	3-669-600-11	WASHER, FLAT (3.5)	
456	3-429-123-00	SPRING	
457	3-669-302-00	SCREW, FITTING	
458	A-6050-126-A	DRUM ASSY, DSH-22A-R	
459	X-3669-106-1	DAMPER ASSY	
460	A-6760-071-A	DRUM UPPER ASSY	
461	A-6762-072-A	DISK ASSY, DSR-22-R	
462	♠:X-3669-105-1	SPACER BLOCK ASSY	
463	X-2621-204-0	STATOR ASSY, DRUM	
464	X-2621-202-0	ROTATOR ASSY, DRUM	
465	♠:3-669-646-00	SPACER, DRUM	
466	♠:3-669-646-11	SPACER, DRUM	

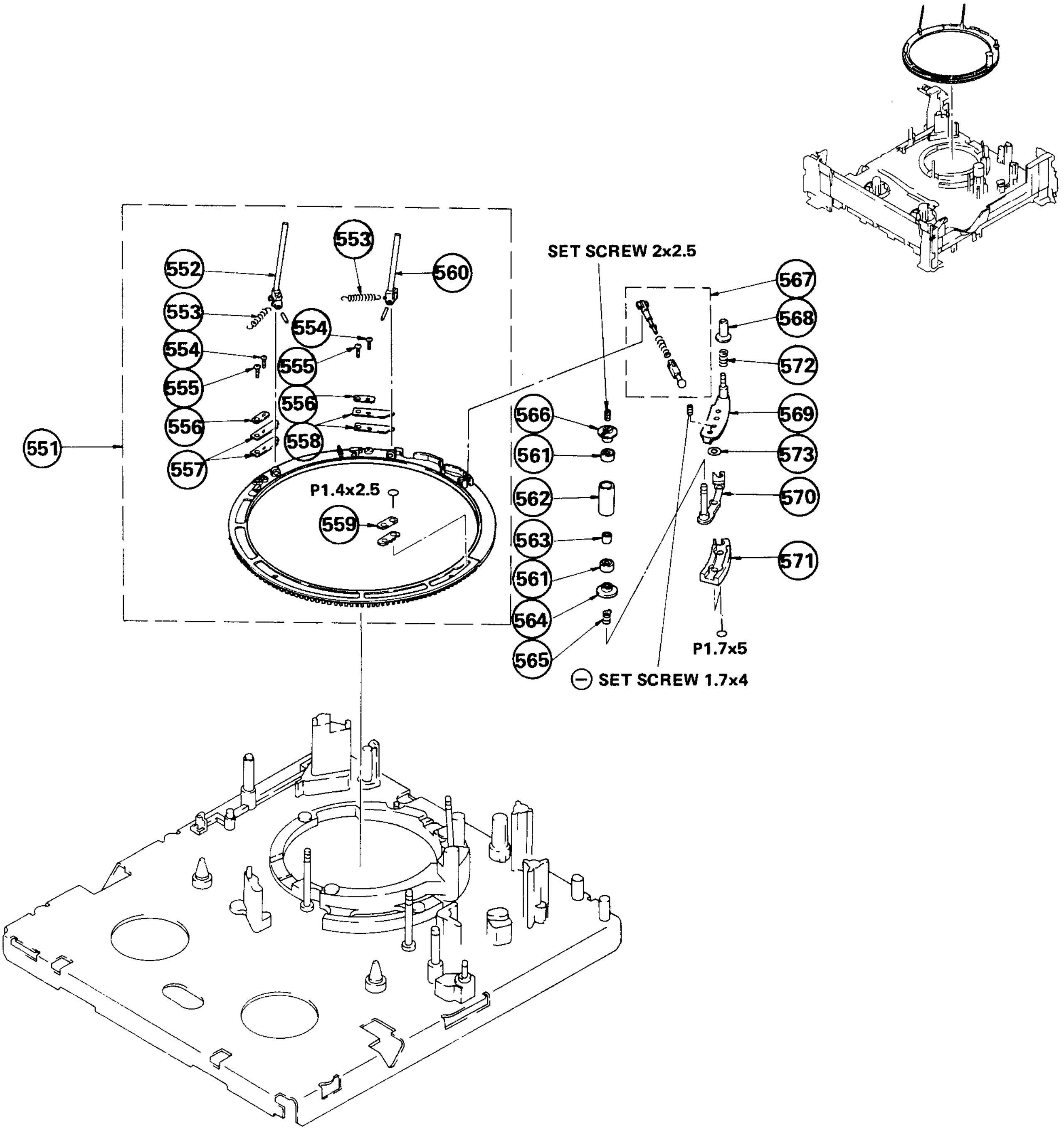
(11) DRIVE GEAR AND T SLIDER ASSEMBLY




501
PTP2.6x8
PTP2.6x8
502
503
504
505
501
SET SCREW 2x2.5
509
510
511
512
510
513
514
515
516
517
506
518
507
508

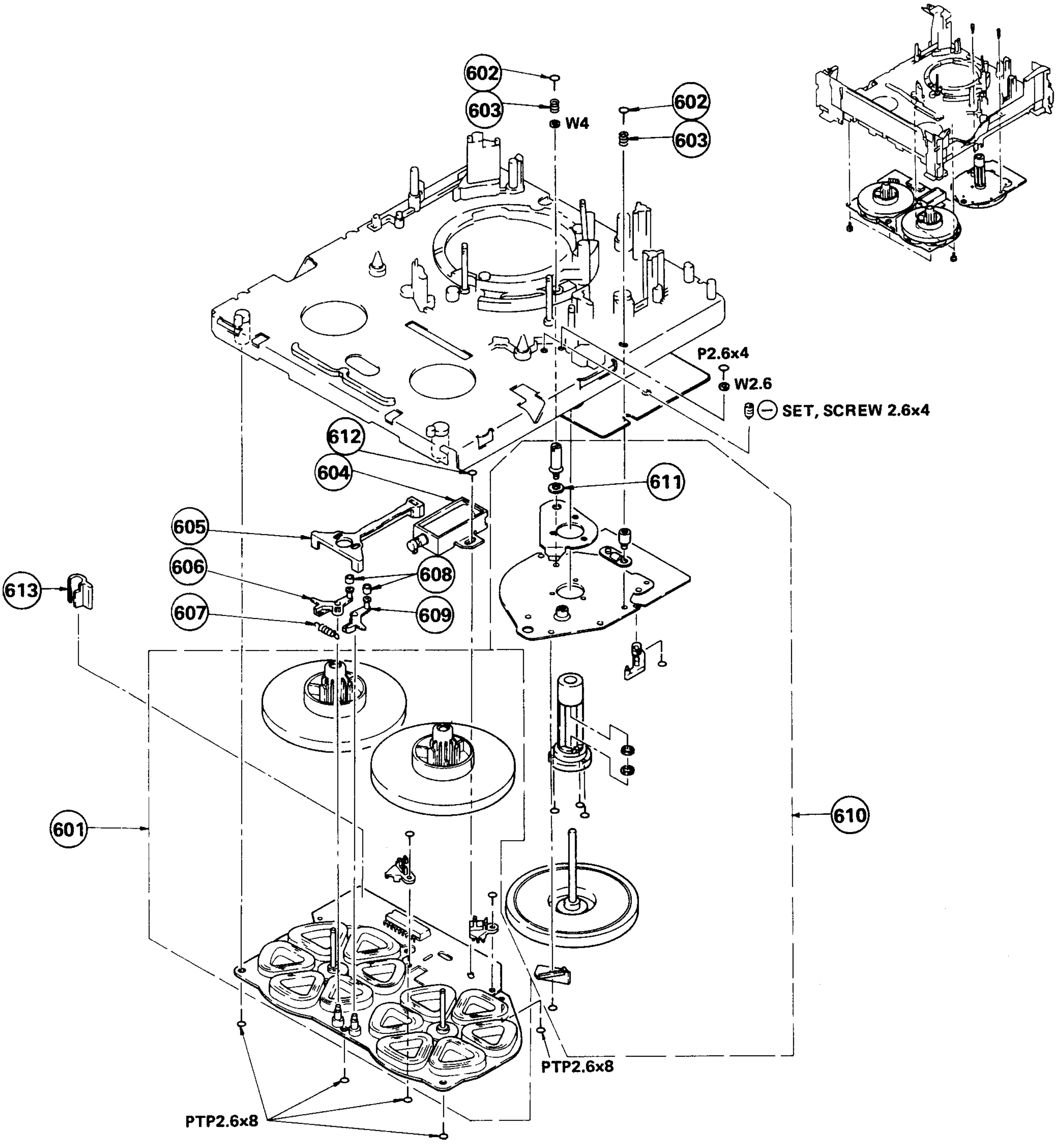
No.	Part No	Description	Remark
501	3-669-465-00	WASHER (1.5), STOPPER	
502	X-3669-326-0	CHASSIS ASSY, GEAR, DRIVE	
503	X-3669-305-0	GEAR (F) ASSY	
504	3-669-338-00	GEAR (E)	
505	3-669-337-00	GEAR (D)	
506	3-669-596-00	WASHER (2.3), STOPPER	
507	X-3669-307-6	ARM ASSY, PINCH ROLLER	
508	3-669-444-00	SPRING, TORSION	
509	3-669-431-00	FLANGE (UPPER), GUIDE	
510	3-669-443-00	BEARING, BALL (NO FLANGE)	
511	3-669-438-00	ROLLER, GUIDE	
512	3-657-841-31	SPACER (DIA. 2)	
513	3-669-432-00	FLANGE (LOWER), GUIDE	
514	3-669-452-00	SPRING, COMPRESSION	
515	3-669-607-31	+PSW (SMALL ROUND) (2.6)	
516	♠:3-669-350-00	STOPPER, SLIDER	
517	♠:X-3669-350-0	GEAR ASSY, SLIDER	
518	3-701-439-01	WASHER	

(12) THREADING RING ASSEMBLY


551
552
553
554
555
556
557
558
559
560
561
562
563
564
565
566
567
568
569
570
571
572
573
SET SCREW 2x2.5
P1.4x2.5
P1.7x5
⊖ SET SCREW 1.7x4

No.	Part No	Description	Remark	No.	Part No	Description	Remark
551	X-3669-353-0	RING ASSY, THREADING, S	552,560	563	3-657-841-31	SPACER (DIA. 2)	
552	♠:X-3669-303-0	GUIDE ASSY, NO. 2		564	3-669-667-00	FLANGE (LOWER), GUIDE	
553	3-669-473-00	SPRING, TENSION		565	3-669-666-00	SPRING, COMPRESSION	
554	3-669-478-00	SCREW (1X3), TAPPING		566	3-669-431-00	FLANGE (UPPER), GUIDE	
555	3-669-479-11	SCREW (1.4X3.5), TAPPING		567	X-3669-316-0	ROD ASSY, PUSH	
556	♠:3-669-472-00	RETAINER, SPRING, LEAF		568	♠:3-669-643-00	SLEEVE, GUIDE, NO. 4	
557	3-669-470-00	SPRING (2), LEAF		569	♠:X-3669-314-0	PLATE ASSY, SHUTTLE	
558	3-669-471-00	SPRING (3), LEAF, LIMITER		570	♠:X-3669-315-0	HEAD ASSY, TILT	
559	♠:3-669-616-00	RETAINER		571	♠:3-669-540-00	BLOCK, SHUTTLE	
560	♠:X-3669-304-0	GUIDE ASSY, NO. 3		572	3-672-531-00	SPRING, COMPRESSION	
561	3-669-443-00	BEARING, BALL (NO FLANGE)		573	3-701-437-11	WASHER	
562	3-669-668-00	ROLLER, GUIDE					

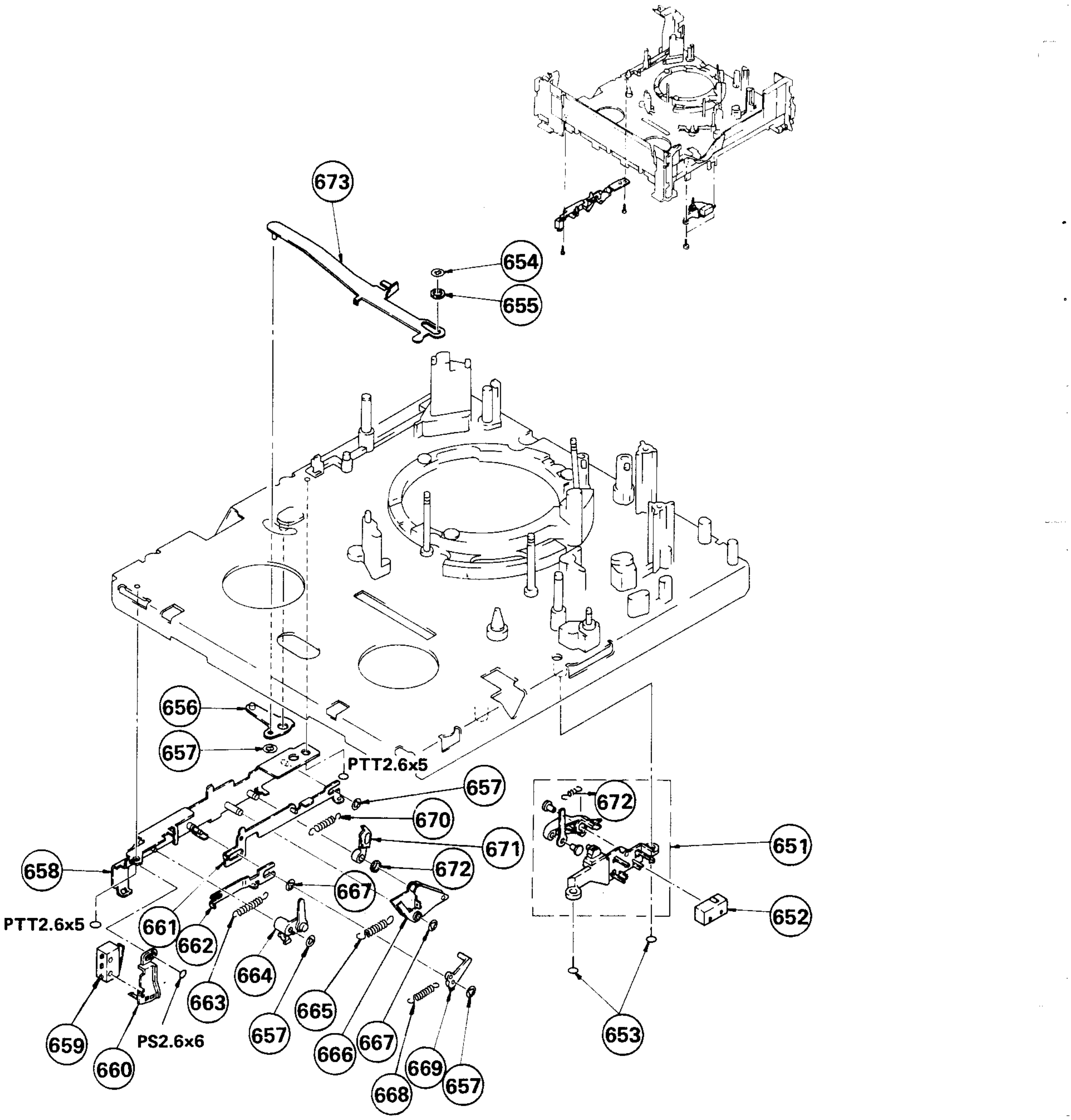
(13) CAPSTAN MOTOR ASSEMBLY


602
603
W4
602
603
P2.6x4
W2.6
SET, SCREW 2.6x4
612
604
611
605
608
606
613
609
607
601
610
PTP2.6x8
PTP2.6x8

No.	Part No	Description	Remark
601	8-838-021-03	MOTOR, DC	
602	3-669-633-00	SCREW, + PW2	
603	3-669-602-00	SPRING, COMPRESSION	
604	⚠.1-454-281-00	SOLENOID, PLUNGER	
605	•:3-669-530-00	ARM, BRAKE	
606	•:3-669-304-00	BRAKE, S	
607	3-491-360-00	SPRING, TENSION	
608	3-669-305-00	BUSHING	
609	•:3-669-303-00	BRAKE, T	
610	8-838-027-01	MOTOR, DC (BHF-1901A)	
611	3-669-697-00	SPACER, CAPSTAN	
612	3-669-663-00	+PSW 2.6	
613	3-672-533-00	STUD	

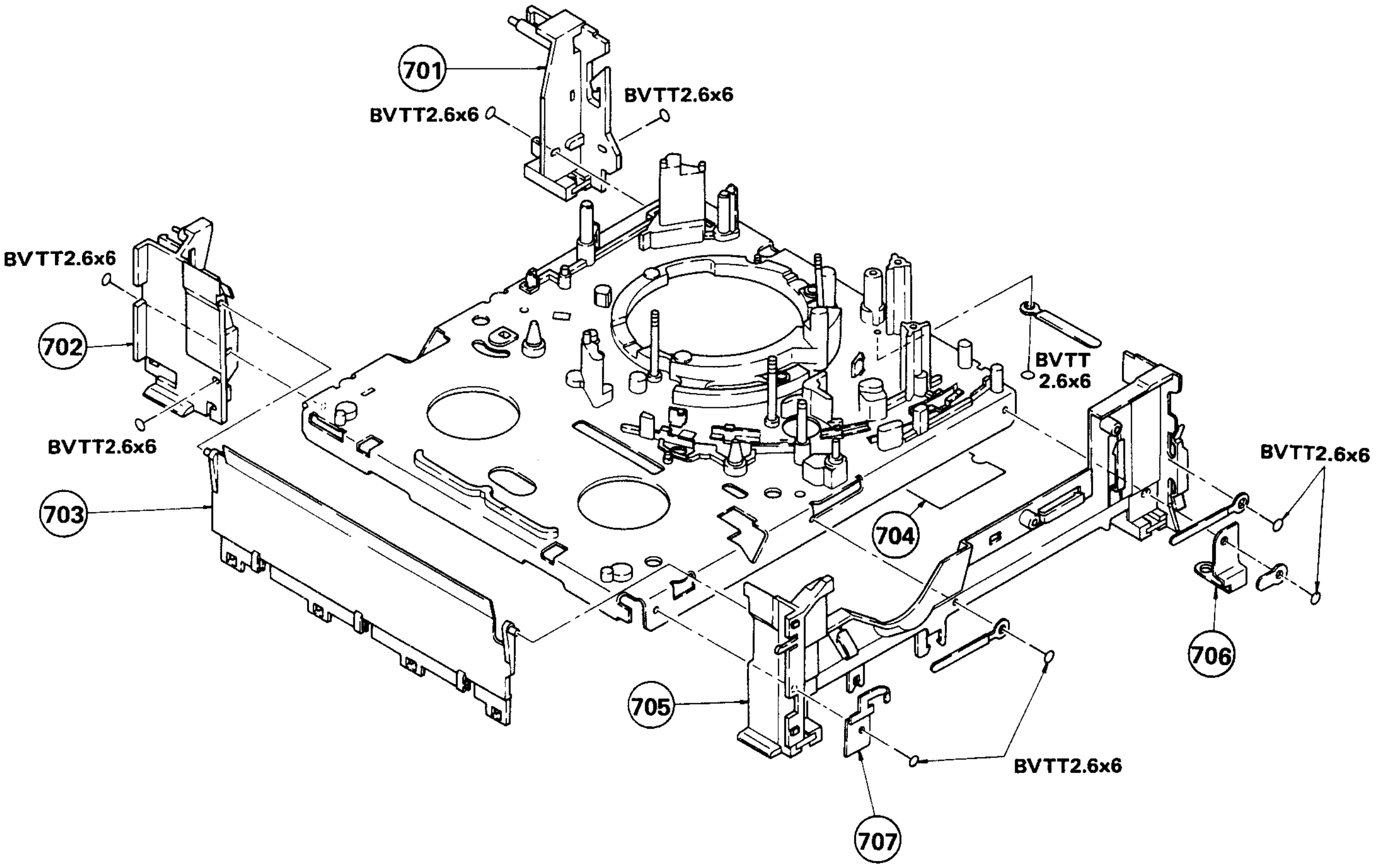
The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.

(14) CASSETTE COMPARTMENT LOCK ASSEMBLY


673
654
655
656
657
PTT2.6x5
657
670
671
672
672
651
658
667
652
PTT2.6x5
661
662
664
663
665
657
666
667
669
657
668
659
PS2.6x6
660
653

No.	Part No	Description	Remark
651	♠:X-3669-323-0	MR ASSY	672
652	1-553-717-00	SWITCH, MICRO	
653	3-669-480-11	+ PTPWH 2	
654	3-669-595-00	WASHER (2), STOPPER	
655	3-701-438-21	WASHER	
656	♠:X-3669-331-0	LEVER ASSY, RELEASE	
657	3-669-465-00	WASHER (1.5), STOPPER	
658	♠:X-3669-378-0	CHASSIS ASSY, LOCK	
659	1-553-718-00	SWITCH, MICRO	
660	♠:3-669-422-00	HOLDER, MICRO SWITCH	
661	♠:X-3669-376-0	PLATE ASSY, SLIDE, RELEASE	
662	♠:3-669-671-00	PLATE, SLIDE, SWITCH	
663	3-570-896-00	SPRING, TENSION	
664	♠:X-3669-320-0	LEVER ASSY, CI	
665	3-489-310-XX	SPRING, TENSION	
666	:X-3669-377-0	LEVER ASSY, LOCK	
667	3-669-596-00	WASHER (2.3), STOPPER	
668	3-509-123-00	SPRING, TENSION	
669	♠:3-669-414-00	LEVER, HOLDING, IL	
670	3-480-160-XX	SPRING, TENSION	
671	♠:3-669-670-00	LEVER, LOCK, L	
672	♠:3-669-411-00	SPRING, TENSION	
673	♠:X-3669-366-0	PLATE ASSY, SLIDE, IL	674

(15) CHASSIS ASSEMBLY


701
BVTT2.6x6
BVTT2.6x6
BVTT2.6x6
702
BVTT2.6x6
703
BVTT
2.6x6
704
BVTT2.6x6
706
705
BVTT2.6x6
707

No.	Part No	Description	Remark
701	💧:X-3669-345-0	FRAME (B) BLOCK ASSY, CHASSIS	
702	💧:X-3669-344-0	FRAME (A) BLOCK ASSY, CHASSIS	
703	💧:3-669-532-00	PLATE, BLIND	
704	💧:3-669-599-00	INSULATOR	
705	💧:X-3669-346-0	FRAME (C) BLOCK ASSY, CHASSIS	
706	3-669-519-00	PLATE, CONTACT	
707	💧:3-672-502-00	PLATE (R), CONNECTION, BRACKET	

SECTION 5
ELECTRICAL PART LIST

NOTE:

The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.

- =>: Due to standardization, interchangeable replacements may be substituted for parts specified in the diagrams.

- Items marked " ♠ " are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- All variable and adjustable resistors have characteristic curve B, unless otherwise noted.

CAPACITORS
- MF : μF, PF : μμF

RESISTORS
- All resistors are in ohms
- F : nonflammable

COILS
- MMH : mH, UH : μH

When indicating parts by reference number, please include the board name.

Ref.No	Part No	Description			Remark
	♠:A-6711-326-A	SF-5 BOARD, COMPLETE ********************			
	♠:3-672-306-00	INSULATOR (R)			
	♠:3-672-307-00	PLATE, SHIELD, SF			
		CAPACITOR			
C001	1-123-645-00	ELECT	33MF	20%	10V
C002	1-123-645-00	ELECT	33MF	20%	10V
C004	1-123-645-00	ELECT	33MF	20%	10V
C005	1-123-645-00	ELECT	33MF	20%	10V
C006	1-161-021-00	CERAMIC	0.047MF	10%	25V
C007	1-123-617-00	ELECT	10MF	20%	16V
C008	1-102-816-00	CERAMIC	120PF	5%	50V
C009	1-123-645-00	ELECT	33MF	20%	10V
C010	1-123-645-00	ELECT	33MF	20%	10V
C011	1-123-645-00	ELECT	33MF	20%	10V
C012	1-123-612-00	ELECT	2.2MF	20%	50V
C013	1-123-612-00	ELECT	2.2MF	20%	50V
C014	1-123-645-00	ELECT	33MF	20%	10V
C015	1-123-645-00	ELECT	33MF	20%	10V
C016	1-123-619-00	ELECT	4.7MF	20%	50V
C017	1-123-816-00	ELECT	47MF	20%	50V
C018	1-123-619-00	ELECT	4.7MF	20%	50V
C019	1-123-622-00	ELECT	22MF	20%	16V
C020	1-123-622-00	ELECT	22MF	20%	16V
C021	1-123-619-00	ELECT	4.7MF	20%	50V
C022	1-123-645-00	ELECT	33MF	20%	10V
C023	1-161-021-00	CERAMIC	0.047MF	10%	25V
C024	1-161-021-00	CERAMIC	0.047MF	10%	25V
C025	1-107-211-00	MICA	24PF	5%	500V
C027	1-161-021-00	CERAMIC	0.047MF	10%	25V
C028	1-161-021-00	CERAMIC	0.047MF	10%	25V
C029	1-123-611-00	ELECT	1MF	20%	50V
C030	1-161-039-00	CERAMIC	0.001MF	10%	25V
C031	1-108-561-00	MYLAR	0.0018MF	5%	50V
C032	1-123-610-00	ELECT	0.47MF	20%	50V
C033	1-123-619-00	ELECT	4.7MF	20%	50V
C034	1-123-619-00	ELECT	4.7MF	20%	50V
C035	1-123-613-00	ELECT	3.3MF	20%	50V
C036	1-123-645-00	ELECT	33MF	20%	10V
C037	1-102-512-00	CERAMIC	16PF	5%	50V
C038	1-123-645-00	ELECT	33MF	20%	10V
C039	1-123-607-00	ELECT	0.1MF	20%	50V
C040	1-123-307-00	ELECT	100MF	20%	10V
C042	1-161-021-00	CERAMIC	0.047MF	10%	25V
C043	1-123-645-00	ELECT	33MF	20%	10V
C044	1-123-617-00	ELECT	10MF	20%	16V
C045	1-161-013-00	CERAMIC	0.01MF	10%	25V
C046	1-123-622-00	ELECT	22MF	20%	16V
C047	1-102-962-00	CERAMIC	30PF	5%	50V
C048	1-123-612-00	ELECT	2.2MF	20%	50V
C049	1-161-021-00	CERAMIC	0.047MF	10%	25V

Ref.No	Part No	Description			Remark
C050	1-161-021-00	CERAMIC	0.047MF	10%	25V
C051	1-161-021-00	CERAMIC	0.047MF	10%	25V
C052	1-161-013-00	CERAMIC	0.01MF	10%	25V
C053	1-161-013-00	CERAMIC	0.01MF	10%	25V
C055	1-123-612-00	ELECT	2.2MF	20%	50V
C060	1-161-025-00	CERAMIC	0.1MF	10%	25V
C061	1-161-021-00	CERAMIC	0.047MF	10%	25V
C062	1-161-021-00	CERAMIC	0.047MF	10%	25V
C063	1-161-021-00	CERAMIC	0.047MF	10%	25V
		FILTER			
CF001	1-527-875-00	FILTER, CERAMIC			
CF003	1-527-849-00	FILTER, CERAMIC			
		CONNECTOR			
CN001	♠:1-560-471-00	PIN, CONNECTOR 10P			
CN002	♠:1-560-471-00	PIN, CONNECTOR 10P			
CN003	♠:1-560-461-00	PIN, CONNECTOR 5P			
		TRIMER			
CV001	1-141-246-00	CAP, TRIMER 100PF			
		DIODE			
D001	8-719-911-19	DIODE 1SS119			
D002	8-719-911-19	DIODE 1SS119			
D003	8-719-911-19	DIODE 1SS119			
D004	8-719-911-19	DIODE 1SS119			
D005	8-719-911-19	DIODE 1SS119			
		DELAY LINE			
DL001	1-415-273-00	DELAY LINE (1H)			
DL002	1-415-223-21	DELAY LINE			
		IC			
IC001	8-759-208-94	IC CX894			
IC003	8-741-102-10	IC BX1021			
IC004	8-741-102-20	IC BX1022			
IC005	8-741-102-50	IC BX1025			
IC006	8-741-102-60	IC BX1026			
IC007	8-741-102-70	IC BX1027			
IC008	8-741-103-20	IC BX1032			
IC009	8-741-103-30	IC BX1033			
IC010	8-741-103-40	IC BX1034			
		COIL			
L001	1-408-429-00	MICRO INDUCTOR 470UH			
L002	1-408-397-00	MICRO INDUCTOR 1UH			
L003	1-408-397-00	MICRO INDUCTOR 1UH			
L004	1-408-421-00	MICRO INDUCTOR 100UH			
L005	1-408-429-00	MICRO INDUCTOR 470UH			
L007	1-408-421-00	MICRO INDUCTOR 100UH			
L008	1-408-429-00	MICRO INDUCTOR 470UH			
L050	1-408-415-00	MICRO INDUCTOR 33UH			

VARIABLE COIL

Ref.No	Part No	Description			Remark
LV001	1-408-512-00	COIL (VARIABLE) 10UH			

TRANSISTOR

Ref.No	Part No	Description			Remark
Q002	=>8-729-612-77	TRANSISTOR 2SA1027R			
Q003	=>8-724-375-01	TRANSISTOR 2SC403C			
Q004	=>8-724-375-01	TRANSISTOR 2SC403C			
Q005	8-729-178-54	TRANSISTOR 2SC2785			
Q006	8-729-178-54	TRANSISTOR 2SC2785			
Q007	8-729-178-54	TRANSISTOR 2SC2785			

RESISTOR

Ref.No	Part No	Description			Remark
R001	1-246-801-00	CARBON	33K	1/8W	
R002	1-246-775-00	CARBON	220	1/8W	
R003	1-246-840-00	CARBON	510	1/8W	
R004	1-246-782-00	CARBON	820	1/8W	
R006	1-246-801-00	CARBON	33K	1/8W	
R007	1-246-803-00	CARBON	47K	1/8W	
R008	1-247-055-00	CARBON	300K	1/8W	
R009	1-246-833-00	CARBON	130	1/8W	
R011	1-247-053-00	CARBON	1M	1/8W	
R012	1-246-799-00	CARBON	22K	1/8W	
R013	1-246-807-00	CARBON	100K	1/8W	
R014	1-246-798-00	CARBON	18K	1/8W	
R015	1-246-807-00	CARBON	100K	1/8W	
R016	1-246-807-00	CARBON	100K	1/8W	
R017	1-247-052-00	CARBON	820K	1/8W	
R018	1-247-052-00	CARBON	820K	1/8W	
R019	1-246-801-00	CARBON	33K	1/8W	
R020	1-246-801-00	CARBON	33K	1/8W	
R021	1-246-799-00	CARBON	22K	1/8W	
R022	1-246-803-00	CARBON	47K	1/8W	
R023	1-246-801-00	CARBON	33K	1/8W	
R024	1-246-795-00	CARBON	10K	1/8W	
R025	1-246-785-00	CARBON	1.5K	1/8W	
R026	1-246-863-00	CARBON	43K	1/8W	
R027	1-246-800-00	CARBON	27K	1/8W	
R028	1-246-783-00	CARBON	1K	1/8W	
R029	1-246-804-00	CARBON	56K	1/8W	
R030	1-246-806-00	CARBON	82K	1/8W	
R031	1-246-777-00	CARBON	330	1/8W	
R033	1-246-849-00	CARBON	3K	1/8W	
R034	1-246-779-00	CARBON	470	1/8W	
R036	1-246-807-00	CARBON	100K	1/8W	
R037	1-246-807-00	CARBON	100K	1/8W	
R038	1-246-795-00	CARBON	10K	1/8W	
R039	1-246-833-00	CARBON	130	1/8W	
R040	1-246-847-00	CARBON	2K	1/8W	
R041	1-246-797-00	CARBON	15K	1/8W	
R042	1-246-851-00	CARBON	4.3K	1/8W	
R043	1-246-785-00	CARBON	1.5K	1/8W	
R044	1-246-840-00	CARBON	510	1/8W	
R050	1-246-790-00	CARBON	3.9K	1/8W	
R051	1-246-834-00	CARBON	160	1/8W	

VARIABLE RESISTOR

Ref.No	Part No	Description	Remark
RV001	1-226-776-00	RES, ADJ, METAL GLAZE 220K	
RV002	1-226-773-00	RES, ADJ, METAL GLAZE 22K	
RV003	1-226-774-00	RES, ADJ, METAL GLAZE 47K	
RV004	1-226-774-00	RES, ADJ, METAL GLAZE 47K	
RV005	1-226-773-00	RES, ADJ, METAL GLAZE 22K	
RV007	1-226-703-00	RES, ADJ, METAL GLAZE 10K	
RV008	1-226-773-00	RES, ADJ, METAL GLAZE 22K	
RV009	1-226-772-00	RES, ADJ, METAL GLAZE 4.7K	
RV010	1-226-703-00	RES, ADJ, METAL GLAZE 10K	
RV011	1-226-703-00	RES, ADJ, METAL GLAZE 10K	
RV012	1-226-703-00	RES, ADJ, METAL GLAZE 10K	
RV013	1-226-770-00	RES, ADJ, METAL GLAZE 470	
RV014	1-226-773-00	RES, ADJ, METAL GLAZE 22K	
RV015	1-226-771-00	RES, ADJ, METAL GLAZE 1K	
RV016	1-226-773-00	RES, ADJ, METAL GLAZE 22K	
RV017	1-226-702-00	RES, ADJ, METAL GLAZE 2.2K	
RV018	1-226-771-00	RES, ADJ, METAL GLAZE 1K	

TRANSFORMER

Ref.No	Part No	Description	Remark
T001	1-426-093-00	COIL, REC C BPT	
T002	1-235-098-00	FILTER, BAND PASS: BPF	

CRYSTAL

Ref.No	Part No	Description	Remark
X001	1-527-345-00	CRYSTAL, OSC	

****

●:1-606-730-00 SF-6 BOARD
****

●:3-672-322-00 CASE (MAIN) (D), SHIELD

CAPACITOR

Ref.No	Part No	Description				Remark
C101	1-123-645-00	ELECT	33MF	20%	10V	
C102	1-102-973-00	CERAMIC	100PF	5%	50V	
C103	1-101-361-00	CERAMIC	150PF	5%	50V	
C104	1-101-361-00	CERAMIC	150PF	5%	50V	
C105	1-161-013-00	CERAMIC	0.01MF	10%	25V	
C106	1-161-013-00	CERAMIC	0.01MF	10%	25V	
C107	1-161-013-00	CERAMIC	0.01MF	10%	25V	
C108	1-161-021-00	CERAMIC	0.047MF	10%	25V	
C109	1-123-645-00	ELECT	33MF	20%	10V	

FILTER

Ref.No	Part No	Description	Remark
CF101	1-527-874-00	FILTER, CERAMIC	

CONNECTOR

Ref.No	Part No	Description	Remark
CN101	●:1-560-741-00	PIN, CONNECTOR 12P	

When indicating parts by reference number, please include the board name.

SF-6

LS-8

IC

Ref.No	Part No	Description
IC101	8-759-919-05	IC CX7905A
IC102	8-759-919-06	IC CX7906
IC103	8-752-000-80	IC CX20008
IC104	8-759-108-05	IC UPC78L05A

COIL

Ref.No	Part No	Description
L101	1-408-421-00	MICRO INDUCTOR 100UH

RESISTOR

Ref.No	Part No	Description		
R101	1-246-795-00	CARBON	10K	1/8W
R102	1-246-797-00	CARBON	15K	1/8W
R103	1-246-803-00	CARBON	47K	1/8W
R104	1-246-783-00	CARBON	1K	1/8W
R105	1-246-860-00	CARBON	24K	1/8W
R106	1-246-783-00	CARBON	1K	1/8W
R107	1-246-791-00	CARBON	4.7K	1/8W

VARIABLE RESISTOR

Ref.No	Part No	Description
RV101	1-226-773-00	RES, ADJ, METAL GLAZE 22K
RV102	1-226-773-00	RES, ADJ, METAL GLAZE 22K
RV103	1-226-773-00	RES, ADJ, METAL GLAZE 22K

* * *

♦:A-6713-123-A LS-8 BOARD, COMPLETE

♦:3-669-625-00 LID, SHIELD CASE, LS-A
♦:3-669-628-00 CASE (MAIN), SHIELD, LS-A

CAPACITOR

Ref.No	Part No	Description			Remark
C001	1-123-647-00	ELECT	47MF	20%	6.3V
C002	1-123-822-00	ELECT	47MF	20%	10V
C003	1-123-617-00	ELECT	10MF	20%	16V
C004	1-123-622-00	ELECT	22MF	20%	16V
C005	1-123-356-00	ELECT	10MF	20%	16V
C006	1-130-493-51	MYLAR	0.068MF	5%	50V
C007	1-123-380-00	ELECT	1MF	20%	50V
C008	1-123-307-00	ELECT	100MF	20%	10V
C009	1-123-332-00	ELECT	47MF	20%	16V
C010	1-123-356-00	ELECT	10MF	20%	16V
C011	1-123-306-00	ELECT	47MF	20%	10V
C012	1-123-356-00	ELECT	10MF	20%	16V
C013	1-123-356-00	ELECT	10MF	20%	16V
C014	1-123-356-00	ELECT	10MF	20%	16V
C015	1-123-295-00	ELECT	100MF	20%	6.3V
C016	1-123-328-00	ELECT	4.7MF	20%	25V
C017	1-123-356-00	ELECT	10MF	20%	16V
C018	1-123-356-00	ELECT	10MF	20%	16V
C019	1-123-380-00	ELECT	1MF	20%	50V
C020	1-123-380-00	ELECT	1MF	20%	50V
C021	1-108-571-00	MYLAR	0.0047MF	5%	50V
C022	1-108-567-00	MYLAR	0.0033MF	5%	50V
C023	1-123-305-00	ELECT	33MF	20%	10V
C025	1-102-961-00	CERAMIC	27PF	5%	50V
C026	1-129-710-00	FILM	0.0047MF	10%	630V
C027	1-102-980-00	CERAMIC	270PF	5%	50V
C028	1-123-356-00	ELECT	10MF	20%	16V
C029	1-102-973-00	CERAMIC	100PF	5%	50V
C030	1-123-328-00	ELECT	4.7MF	20%	25V
C032	1-123-306-00	ELECT	47MF	20%	10V
C040	1-130-474-00	MYLAR	0.0018MF	5%	50V
C041	1-130-484-00	MYLAR	0.012MF	5%	50V
C042	1-161-051-00	CERAMIC	0.01MF	10%	50V
C043	1-161-039-00	CERAMIC	0.001MF	10%	25V
C200	1-123-319-00	ELECT	47MF	20%	16V
C201	1-161-051-00	CERAMIC	0.01MF	10%	50V
C202	1-130-499-00	MYLAR	0.22MF	5%	50V
C203	1-130-495-00	MYLAR	0.1MF	5%	50V
C204	1-123-617-00	ELECT	10MF	20%	16V
C205	1-161-051-00	CERAMIC	0.01MF	10%	50V

CONNECTOR

Ref.No	Part No	Description
CN001♦	:1-560-469-00	PIN, CONNECTOR 6P
CN002♦	:1-560-456-00	PIN, CONNECTOR 2P

TRIMER

Ref.No	Part No	Description
CV001	1-141-215-00	CAP, TRIMER

DIODE

Ref.No	Part No	Description
D001	=>8-719-901-33	DIODE 1SS133
D002	=>8-719-901-33	DIODE 1SS133
D003	=>8-719-901-33	DIODE 1SS133
D004	=>8-719-901-33	DIODE 1SS133
D005	=>8-719-901-33	DIODE 1SS133
D006	=>8-719-901-33	DIODE 1SS133
D007	8-719-113-07	DIODE RD13E-B
D200	=>8-719-901-33	DIODE 1SS133
D201	=>8-719-901-33	DIODE 1SS133
D206	=>8-719-901-33	DIODE 1SS133
D207	=>8-719-901-33	DIODE 1SS133
D210	=>8-719-901-33	DIODE 1SS133
D211	=>8-719-901-33	DIODE 1SS133

IC

Ref.No	Part No	Description
IC001	8-741-103-60	IC BX1036
IC003	8-743-973-00	IC BX3973
IC004	=>8-749-910-35	IC BX1035A
IC201	8-759-240-13	IC TC4013BP

When indicating parts by reference number, please include the board name.

Ref.No	Part No	Description				Remark
IC202	8-759-240-52	IC TC4052BP				
IC203	8-759-240-81	IC TC40813P				
IC204	8-759-240-01	IC TC4001BP				
		COIL				
L002	1-408-220-00	MICRO INDUCTOR 18MMH				
L003	1-407-488-00	MICRO INDUCTOR 470UH				
		VARIABLE COIL				
LV001	1-408-523-00	COIL, VARIABLE 22MMH				
LV002	1-408-524-00	INDUCTOR, ADJ 34MMH				
		TRANSISTOR				
Q001	8-729-908-62	TRANSISTOR 2SD786				
Q003	8-729-178-54	TRANSISTOR 2SC2785				
Q004	8-729-967-32	TRANSISTOR 2SC2673				
Q005	8-729-988-12	TRANSISTOR 2SA881				
Q008	8-729-178-54	TRANSISTOR 2SC2785				
Q010	8-729-178-54	TRANSISTOR 2SC2785				
Q011	8-729-178-54	TRANSISTOR 2SC2785				
Q202	8-729-117-54	TRANSISTOR 2SA1175				
Q203	8-729-178-54	TRANSISTOR 2SC2785				
Q204	8-729-178-54	TRANSISTOR 2SC2785				
Q205	8-729-178-54	TRANSISTOR 2SC2785				
Q206	8-729-178-54	TRANSISTOR 2SC2785				
Q207	8-729-178-54	TRANSISTOR 2SC2785				
Q208	8-729-178-54	TRANSISTOR 2SC2785				
		RESISTOR				
R001	1-246-759-00	CARBON	10		1/8W	
R002	1-202-469-00	COMPOSITION	3.9M	5%	1/4W	
R003	1-246-787-00	CARBON	2.2K		1/8W	
R004	1-246-797-00	CARBON	15K		1/8W	
R005	1-247-049-00	CARBON	470K		1/8W	
R009	1-246-768-00	CARBON	56		1/8W	
R010	1-246-784-00	CARBON	1.2K		1/8W	
R011	1-246-795-00	CARBON	10K		1/8W	
R012	1-246-795-00	CARBON	10K		1/8W	
R013	1-246-771-00	CARBON	100		1/8W	
R014	1-246-801-00	CARBON	33K		1/8W	
R015	1-246-795-00	CARBON	10K		1/8W	
R016	1-246-465-00	CARBON	470	5%	1/4W	
R017	1-212-849-00	FUSIBLE	4.7	5%	1/4W	F
R018	1-246-797-00	CARBON	15K		1/8W	
R019	1-246-795-00	CARBON	10K		1/8W	
R020	1-246-801-00	CARBON	33K		1/8W	
R021	1-246-787-00	CARBON	2.2K		1/8W	
R022	1-246-807-00	CARBON	100K		1/8W	
R023	1-246-801-00	CARBON	33K		1/8W	
R026	1-246-840-00	CARBON	510		1/8W	
R027	1-246-787-00	CARBON	2.2K		1/8W	
R040	1-246-793-00	CARBON	6.8K		1/8W	
R041	1-246-800-00	CARBON	27K		1/8W	

Ref.No	Part No	Description				Remark
R042	1-246-785-00	CARBON	1.5K		1/8W	
R043	1-246-801-00	CARBON	33K		1/8W	
R044	1-246-777-00	CARBON	330		1/8W	
R046	1-246-543-00	CARBON	820K	5%	1/4W	
R201	1-246-795-00	CARBON	10K		1/8W	
R203	1-246-795-00	CARBON	10K		1/8W	
R204	1-246-795-00	CARBON	10K		1/8W	
R205	1-246-795-00	CARBON	10K		1/8W	
R206	1-246-795-00	CARBON	10K		1/8W	
R207	1-246-807-00	CARBON	100K		1/8W	
R211	1-246-807-00	CARBON	100K		1/8W	
R212	1-246-783-00	CARBON	1K		1/8W	
R213	1-246-803-00	CARBON	47K		1/8W	
R217	1-246-783-00	CARBON	1K		1/8W	
R220	1-246-803-00	CARBON	47K		1/8W	
R221	1-246-807-00	CARBON	100K		1/8W	
R222	1-246-803-00	CARBON	47K		1/8W	
R225	1-246-811-00	CARBON	220K		1/8W	
R226	1-246-803-00	CARBON	47K		1/8W	
R230	1-246-857-00	CARBON	13K		1/8W	
R231	1-246-799-00	CARBON	22K		1/8W	
R237	1-246-795-00	CARBON	10K		1/8W	
R240	1-246-803-00	CARBON	47K		1/8W	
R241	1-246-807-00	CARBON	100K		1/8W	
R242	1-246-803-00	CARBON	47K		1/8W	
		VARIABLE RESISTOR				
RV001	1-226-774-00	RES, ADJ, METAL GLAZE 47K				
RV002	1-226-775-00	RES, ADJ, METAL GLAZE 100K				
RV003	1-226-710-00	RES, ADJ, SOLID 10K				
RV202	1-226-776-00	RES, ADJ, METAL GLAZE 220K				
RV203	1-226-776-00	RES, ADJ, METAL GLAZE 220K				
RV205	1-226-704-00	RES, ADJ, METAL GLAZE 470K				
RV209	1-226-704-00	RES, ADJ, METAL GLAZE 470K				
RV210	1-226-704-00	RES, ADJ, METAL GLAZE 470K				
RV211	1-226-773-00	RES, ADJ, METAL GLAZE 22K				
		RELAY				
RY001	1-515-418-00	RELAY				
RY002	1-515-416-00	RELAY				
		TRANSFORMER				
T001	1-433-236-00	TRANSFORMER, OSCILLATOR				
T002	1-427-506-00	TRANSFORMER, OUTPUT				

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♠:A-6715-140-A	MA-3 BOARD, COMPLETE ********************
1-426-105-00	TRANSFORMER, MODULATION
1-464-181-00	MODULATOR, RF; RFM-110-E (AEP MODEL)
1-464-240-00	MODULATOR, RF; RFM-110-C (Chinese Model)
♠:1-533-087-00	HOLDER, FUSE
♠:3-669-513-00	SPACER, MICROPHONE JACK
♠:3-669-610-00	SPACER

When indicating parts by reference number, please include the board name.

MA-3

Ref.No	Part No	Description			Remark
		CAPACITOR			
C001	1-123-645-00	ELECT	33MF	20%	10V
C002	1-123-645-00	ELECT	33MF	20%	10V
C003	1-123-645-00	ELECT	33MF	20%	10V
C004	1-123-645-00	ELECT	33MF	20%	10V
C005	1-123-645-00	ELECT	33MF	20%	10V
C006	1-108-603-00	MYLAR	0.1MF	5%	50V
C007	1-123-645-00	ELECT	33MF	20%	10V
C008	1-123-619-00	ELECT	4.7MF	20%	50V
C010	1-123-822-00	ELECT	47MF	20%	10V
C011	1-108-603-00	MYLAR	0.1MF	5%	50V
C013	1-123-645-00	ELECT	33MF	20%	10V
C015	1-123-619-00	ELECT	4.7MF	20%	50V
C016	1-123-610-00	ELECT	0.47MF	20%	50V
C017	1-123-645-00	ELECT	33MF	20%	10V
C019	1-123-645-00	ELECT	33MF	20%	10V
C020	1-108-557-00	MYLAR	0.0012MF	5%	50V
C021	1-123-622-00	ELECT	22MF	20%	16V
C025	1-161-013-00	CERAMIC	0.01MF	10%	25V
C026	1-123-617-00	ELECT	10MF	20%	16V
C028	1-123-311-00	ELECT	1000MF	20%	10V
C029	1-161-013-00	CERAMIC	0.01MF	10%	25V
C031		ELECT	10MF		50V
C035	1-123-310-00	ELECT	470MF	20%	10V
C038	1-161-021-00	CERAMIC	0.047MF	10%	25V
C040	1-123-321-00	ELECT	220MF	20%	16V
C041	1-161-011-00	CERAMIC	0.0068MF	10%	25V
C043	1-102-958-00	CERAMIC	20PF	5%	50V
C044		ELECT	10MF		50V
C045	1-101-880-00	CERAMIC	47PF	5%	50V
C046	1-123-661-00	ELECT	100MF	20%	6.3V
C060	1-101-884-00	CERAMIC	56PF	5%	50V
C061	1-161-021-00	CERAMIC	0.047MF	10%	25V
C062	1-161-021-00	CERAMIC	0.047MF	10%	25V
C201	1-123-318-00	ELECT	33MF	20%	16V
C202	1-161-057-00	CERAMIC	0.033MF	10%	50V
C203	1-123-617-00	ELECT	10MF	20%	16V
C204	1-123-617-00	ELECT	10MF	20%	16V
C205	1-161-039-00	CERAMIC	0.001MF	10%	25V
C206	1-123-333-00	ELECT	100MF	20%	16V
C207	1-123-318-00	ELECT	33MF	20%	16V
C208	1-161-057-00	CERAMIC	0.033MF	10%	50V
C209	1-130-482-00	MYLAR	0.0082MF	5%	50V
C210	1-130-482-00	MYLAR	0.0082MF	5%	50V
C211	1-123-612-00	ELECT	2.2MF	20%	50V
C212	1-123-612-00	ELECT	2.2MF	20%	50V
C213	1-123-611-00	ELECT	1MF	20%	50V
C214	1-123-611-00	ELECT	1MF	20%	50V
C215	1-123-611-00	ELECT	1MF	20%	50V
C216	1-123-611-00	ELECT	1MF	20%	50V
C217	1-123-617-00	ELECT	10MF	20%	16V
C218	1-123-318-00	ELECT	33MF	20%	16V
C219	1-161-057-00	CERAMIC	0.033MF	10%	50V
C220	1-123-318-00	ELECT	33MF	20%	16V
C221	1-161-057-00	CERAMIC	0.033MF	10%	50V
C222	1-123-611-00	ELECT	1MF	20%	50V
C223	1-123-611-00	ELECT	1MF	20%	50V
C224	1-161-009-00	CERAMIC	0.0047MF	10%	25V
C226	1-161-039-00	CERAMIC	0.001MF	10%	25V
C228	1-123-611-00	ELECT	1MF	20%	50V
C229	1-123-613-00	ELECT	3.3MF	20%	50V
C230	1-123-318-00	ELECT	33MF	20%	16V
C231	1-161-057-00	CERAMIC	0.033MF	10%	50V
C232	1-161-057-00	CERAMIC	0.033MF	10%	50V
C233	1-123-820-00	ELECT	33MF	20%	16V
C234	1-161-057-00	CERAMIC	0.033MF	10%	50V
C235	1-161-021-00	CERAMIC	0.047MF	10%	25V
C236	1-161-021-00	CERAMIC	0.047MF	10%	25V
C237	1-161-005-00	CERAMIC	0.0022MF	10%	25V
C238	1-123-616-00	ELECT	4.7MF	20%	25V
C239	1-161-057-00	CERAMIC	0.033MF	10%	50V
C240	1-161-057-00	CERAMIC	0.033MF	10%	50V
C241	1-123-611-00	ELECT	1MF	20%	50V
C242	1-161-021-00	CERAMIC	0.047MF	10%	25V
C243	1-161-021-00	CERAMIC	0.047MF	10%	25V
C244	1-161-005-00	CERAMIC	0.0022MF	10%	25V
C245	1-161-005-00	CERAMIC	0.0022MF	10%	25V
C401	1-161-021-00	CERAMIC	0.047MF	10%	25V
C402	1-161-021-00	CERAMIC	0.047MF	10%	25V
C403	1-161-021-00	CERAMIC	0.047MF	10%	25V
C404	1-123-613-00	ELECT	3.3MF	20%	50V
C405	1-123-613-00	ELECT	3.3MF	20%	50V
C406	1-123-613-00	ELECT	3.3MF	20%	50V
C407	1-130-483-51	MYLAR	0.01MF	5%	50V
C409	1-130-483-51	MYLAR	0.01MF	5%	50V
C410	1-123-296-00	ELECT	220MF	20%	6.3V
C412	1-161-016-00	CERAMIC	0.018MF	10%	25V
C413	1-161-945-00	CERAMIC	0.022MF	10%	50V
C416	1-123-622-00	ELECT	22MF	20%	16V
C417	1-123-611-00	ELECT	1MF	20%	50V
C420	1-123-318-00	ELECT	33MF	20%	16V
C421	1-123-820-00	ELECT	33MF	20%	16V
C423	1-161-947-00	CERAMIC	220PF	5%	50V
C424	1-161-013-00	CERAMIC	0.01MF	10%	25V
C425	1-161-016-00	CERAMIC	0.018MF	10%	25V
C426	1-127-468-00	ELECT	0.22MF	5%	16V
C427	1-123-822-00	ELECT	47MF	20%	10V
C428	1-130-483-51	MYLAR	0.01MF	5%	50V
C429	1-123-616-00	ELECT	4.7MF	20%	25V
C430	1-123-616-00	ELECT	4.7MF	20%	25V
C431	1-123-296-00	ELECT	220MF	20%	6.3V
C432	1-123-612-00	ELECT	2.2MF	20%	50V
C433	1-130-494-51	MYLAR	0.082MF	5%	50V
C435	1-123-307-00	ELECT	100MF	20%	10V
C436	1-123-647-00	ELECT	47MF	20%	6.3V

When indicating parts by reference number, please include the board name.

Ref.No	Part No	Description			Remark
C437	1-123-612-00	ELECT	2.2MF	20%	50V
C438	1-123-613-00	ELECT	3.3MF	20%	50V
C439	1-123-611-00	ELECT	1MF	20%	50V
C441	1-161-013-00	CERAMIC	0.01MF	10%	25V
C442	1-161-040-00	CERAMIC	0.0012MF	10%	50V
C443	1-123-613-00	ELECT	3.3MF	20%	50V
C444	1-123-617-00	ELECT	10MF	20%	16V
C445	1-123-822-00	ELECT	47MF	20%	10V
C446	1-123-647-00	ELECT	47MF	20%	6.3V
C447	1-161-021-00	CERAMIC	0.047MF	10%	25V
C448	1-123-333-00	ELECT	100MF	20%	16V
C453	1-123-616-00	ELECT	4.7MF	20%	25V
C454	1-123-616-00	ELECT	4.7MF	20%	25V
C456	1-123-616-00	ELECT	4.7MF	20%	25V
C458	1-161-616-00	CERAMIC	0.01MF	10%	25V
C459	1-161-021-00	CERAMIC	0.047MF	10%	25V
C460	1-102-114-00	CERAMIC	470PF	10%	50V
C461	1-123-612-00	ELECT	2.2MF	20%	50V
C462	1-123-607-00	ELECT	0.1MF	20%	50V
C465	1-161-021-00	CERAMIC	0.047MF	10%	25V
C466	1-130-492-51	MYLAR	0.056MF	5%	50V
C467	1-123-616-00	ELECT	4.7MF	20%	25V
C469	1-130-499-51	MYLAR	0.22MF	5%	50V
C471	1-161-021-00	CERAMIC	0.047MF	10%	25V
C601	1-123-323-00	ELECT	470MF	20%	16V
C602	1-123-323-00	ELECT	470MF	20%	16V
C603	1-123-622-00	ELECT	22MF	20%	16V
C604	1-123-617-00	ELECT	10MF	20%	16V
C605	1-123-616-00	ELECT	4.7MF	20%	25V
C607	1-123-616-00	ELECT	4.7MF	20%	25V
C609	1-161-021-00	CERAMIC	0.047MF	10%	25V
C610	1-161-021-00	CERAMIC	0.047MF	10%	25V
C611	1-161-021-00	CERAMIC	0.047MF	10%	25V
C612	1-161-021-00	CERAMIC	0.047MF	10%	25V
C613	1-161-021-00	CERAMIC	0.047MF	10%	25V
C614	1-161-021-00	CERAMIC	0.047MF	10%	25V
C615	1-161-021-00	CERAMIC	0.047MF	10%	25V
C616	1-161-021-00	CERAMIC	0.047MF	10%	25V
C617	1-123-645-00	ELECT	33MF	20%	10V
C618	1-102-529-00	CERAMIC	100PF	5%	50V
C619	1-102-529-00	CERAMIC	100PF	5%	50V
C620	1-161-013-00	CERAMIC	0.01MF	10%	25V
C621	1-161-013-00	CERAMIC	0.01MF	10%	25V
C623	1-161-013-00	CERAMIC	0.01MF	10%	25V
C680	1-101-882-00	CERAMIC	51PF	5%	50V
C681	1-161-013-00	CERAMIC	0.01MF	10%	25V
C801	1-123-320-00	ELECT	100MF	20%	16V
C802	1-123-822-00	ELECT	47MF	20%	10V
C803	1-123-617-00	ELECT	10MF	20%	16V
C804	1-161-013-00	CERAMIC	0.01MF	10%	25V
C805	1-123-324-00	ELECT	1000MF	20%	16V
C806	1-161-020-00	CERAMIC	0.039MF	10%	25V
C901	1-123-611-00	ELECT	1MF	20%	50V

Ref.No	Part No	Description			Remark
C902	1-123-617-00	ELECT	10MF	20%	16V
C903	1-123-612-00	ELECT	2.2MF	20%	50V
C904	1-123-644-00	ELECT	22MF	20%	10V
C905	1-123-822-00	ELECT	47MF	20%	10V
C906	1-123-617-00	ELECT	10MF	20%	16V
C907	1-123-616-00	ELECT	4.7MF	20%	25V
C908	1-123-647-00	ELECT	47MF	20%	6.3V
C920	1-123-613-00	ELECT	3.3MF	20%	50V
C921	1-161-022-00	CERAMIC	0.056MF	10%	25V
C924	1-161-025-00	CERAMIC	0.1MF	10%	25V

CONNECTOR

Ref.No	Part No	Description
CN001●	1-560-471-00	PIN, CONNECTOR 10P
CN002●	1-560-471-00	PIN, CONNECTOR 10P
CN201●	1-560-459-00	PIN, CONNECTOR 3P
CN202●	1-560-466-00	PIN, CONNECTOR 3P
CN203●	1-560-469-00	PIN, CONNECTOR 6P
CN401●	1-560-467-00	PIN, CONNECTOR 4P
CN403●	1-560-467-00	PIN, CONNECTOR 4P
CN404●	1-560-455-00	PIN, CONNECTOR 2P
CN406●	1-560-466-00	PIN, CONNECTOR 3P
CN407●	1-560-467-00	PIN, CONNECTOR 4P
CN601●	1-560-466-00	PIN, CONNECTOR 3P
CN602●	1-560-466-00	PIN, CONNECTOR 3P
CN603●	1-560-456-00	PIN, CONNECTOR 2P
CN604●	1-560-467-00	PIN, CONNECTOR 4P
CN605●	1-560-456-00	PIN, CONNECTOR 2P
CN606●	1-560-466-00	PIN, CONNECTOR 3P
CN607●	1-560-467-00	PIN, CONNECTOR 4P
CN608●	1-560-466-00	PIN, CONNECTOR 3P
CN609●	1-560-466-00	PIN, CONNECTOR 3P
CN801●	1-561-717-00	CONNECTOR 5P
CN802	1-561-684-00	CONNECTOR, RECEPTACLE 26P
CN804	1-561-690-00	CONNECTOR, CAMERA 14P
CN805●	1-508-742-00	PIN, CONNECTOR 3P

When indicating parts by reference number, please include the board name.

MA-3

Ref.No	Part No	Description	Remark
		DIODE	
D001	8-719-911-19	DIODE 1SS119	
D002	8-719-191-07	DIODE RD9.1E-B	
D003	8-719-191-07	DIODE RD9.1E-B	
D005	8-719-911-19	DIODE 1SS119	
D006	8-719-911-19	DIODE 1SS119	
D201	8-719-911-06	DIODE 1SS106	
D202	8-719-911-06	DIODE 1SS106	
D208	=>8-719-901-33	DIODE 1SS133	
D209	8-719-982-04	DIODE ERB81-004	
D212	=>8-719-901-33	DIODE 1SS133	
D213	8-719-982-04	DIODE ERB81-004	
D215	=>8-719-901-33	DIODE 1SS133	
D402	=>8-719-901-33	DIODE 1SS133	
D403	8-719-982-04	DIODE ERB81-004	
D405	=>8-719-901-33	DIODE 1SS133	
D406	=>8-719-901-33	DIODE 1SS133	
D407	=>8-719-901-33	DIODE 1SS133	
D408	=>8-719-901-33	DIODE 1SS133	
D418	8-719-911-06	DIODE 1SS106	
D419	=>8-719-901-33	DIODE 1SS133	
D422	=>8-719-901-33	DIODE 1SS133	
D423	=>8-719-901-33	DIODE 1SS133	
D424	=>8-719-901-33	DIODE 1SS133	
D425	=>8-719-901-33	DIODE 1SS133	
D601	8-719-200-02	DIODE 10E2	
D602	8-719-200-02	DIODE 10E2	
D603	8-719-911-19	DIODE 1SS119	
D604	8-719-200-02	DIODE 10E2	
D605	8-719-127-07	DIODE RD2.7E-B	
D606	8-719-200-02	DIODE 10E2	
D607	8-719-200-02	DIODE 10E2	
D608	8-719-911-19	DIODE 1SS119	
D609	8-719-911-19	DIODE 1SS119	
D610	8-719-200-02	DIODE 10E2	
D611	8-719-200-02	DIODE 10E2	
D612	8-719-200-02	DIODE 10E2	
D613	8-719-200-02	DIODE 10E2	
D614	8-719-911-19	DIODE 1SS119	
D615	8-719-911-06	DIODE 1SS106	
D616	8-719-911-06	DIODE 1SS106	
D617	8-719-911-06	DIODE 1SS106	
D618	8-719-911-06	DIODE 1SS106	
D619	8-719-113-07	DIODE RD13E-B	
D620	8-719-113-07	DIODE RD13E-B	
D621	8-719-911-19	DIODE 1SS119	
D623	8-719-113-07	DIODE RD13E-B	
D624	8-719-911-19	DIODE 1SS119	
D631	8-719-911-19	DIODE 1SS119	
D632	8-719-911-19	DIODE 1SS119	
D633	8-719-911-19	DIODE 1SS119	
D634	8-719-911-19	DIODE 1SS119	
D635	8-719-100-19	DIODE RD3.6EB2	
D636	8-719-911-19	DIODE 1SS119	
D673	8-719-911-06	DIODE 1SS106	
D678	8-719-911-06	DIODE 1SS106	
D801	8-719-122-07	DIODE RD22E-B	
D802	8-719-122-07	DIODE RD22E-B	
D804	8-719-113-07	DIODE RD13E-B	
D805	8-719-113-07	DIODE RD13E-B	
D806	8-719-113-07	DIODE RD13E-B	
D807	8-719-113-07	DIODE RD13E-B	
D808	8-719-113-07	DIODE RD13E-B	
D809	8-719-122-07	DIODE RD22E-B	
D810	8-719-113-07	DIODE RD13E-B	
D811	8-719-122-07	DIODE RD22E-B	
D812	8-719-122-07	DIODE RD22E-B	
D813	8-719-113-07	DIODE RD13E-B	
D814	8-719-113-07	DIODE RD13E-B	
D817	8-719-122-07	DIODE RD22E-B	
D818	=>8-719-911-55	DIODE U05G	
D819	8-719-982-04	DIODE ERB81-004	
D821	8-719-162-07	DIODE RD6.2E-B	
D822	8-719-911-19	DIODE 1SS119	
D823	8-719-911-19	DIODE 1SS119	
D824	8-719-911-06	DIODE 1SS106	
D827	8-719-113-07	DIODE RD13E-B	
D828	8-719-113-07	DIODE RD13E-B	
D829	8-719-113-07	DIODE RD13E-B	
D830	8-719-118-07	DIODE RD18E-B	
D840	8-719-911-19	DIODE 1SS119	
D841	8-719-911-19	DIODE 1SS119	
D842	8-719-911-19	DIODE 1SS119	
D843	8-719-982-04	DIODE ERB81-004	
D923	8-719-122-07	DIODE RD22E-B	

When indicating parts by reference number, please include the board name.

Ref.No	Part No	Description	Remark
		DELAY LINE	
DL002	1-415-198-00	DELAY LINE (1H)	
		CONVERTER	
DR001	1-447-210-00	CONVERTER, DC-DC	
DR801	1-464-156-00	CONVERTER, DC-DC (CD-02)	
		FUSE	
F801 ⚠	1-532-350-00	FUSE, TIME-LAG 4A	
F802 ⚠	1-532-285-00	FUSE, TIME-LAG 1.25A	
F803 ⚠	1-532-605-00	FUSE, ELECTRIC CURRENT 0.4A	
F804 ⚠	1-532-637-00	FUSE, ELECTRIC CURRENT 1A	
		FILTER	
FL001	1-235-097-00	FILTER, LOW PASS	
		IC	
IC001	8-759-208-94	IC CX894	
IC002	8-759-979-26	IC CX7926	
IC003	8-741-102-40	IC BX1024	
IC004	8-741-102-30	IC BX1023	
IC005	8-741-102-80	IC BX1028	
IC006	8-741-102-90	IC BX1029	
IC007	8-741-103-00	IC BX1030	
IC008=>	8-749-910-48	IC BX1048A	
IC201	8-759-103-93	IC UPC393C	
IC202	8-759-132-40	IC UPC324C	
IC204	8-759-103-93	IC UPC393C	
IC205	8-743-980-00	IC BX3980	
IC206	8-743-976-00	IC BX3976	
IC207	8-741-104-50	IC BX1045	
IC401	8-751-940-03	IC CX194A	
IC402	8-759-240-53	IC TC4053BP	
IC403	8-759-132-40	IC UPC324C	
IC404	8-743-983-00	IC BX3983	
IC405	8-741-104-30	IC BX1043	
IC406	8-759-904-94	IC TL494CN	
IC407	8-759-240-51	IC TC4051BP	
IC408	8-743-978-00	IC BX3978	
IC409	8-743-982-20	IC BX3982-2	
IC410	8-759-240-30	IC TC4030BP	
IC411	8-743-977-00	IC BX3977	
IC412	8-741-013-00	IC BX1013	
IC601	8-759-981-40	IC MB8855-140	
IC602	8-759-900-46	IC MB8855-161	
IC603	8-759-987-47	IC MB8747	
IC604	8-759-240-69	IC TC4069UBP	
IC605	8-759-220-04	IC TC40H004P	
IC606	8-759-240-13	IC TC4013BP	
IC607	8-741-104-70	IC BX1047	
IC608	8-759-133-90	IC UPC339C	
IC609	8-741-104-60	IC BX1046	

Ref.No	Part No	Description	Remark
IC801=>	8-743-999-10	IC BX3999-1	
IC901	8-743-971-00	IC BX3971	
		JACK	
J901	1-507-285-00	JACK	
		COIL	
L001	1-408-407-00	MICRO INDUCTOR 6.8UH	
L002	1-408-409-00	MICRO INDUCTOR 10UH	
L003	1-408-409-00	MICRO INDUCTOR 10UH	
L013	1-408-458-11	MICRO INDUCTOR 220UH	
L014	1-408-442-11	MICRO INDUCTOR 10UH	
L060	1-408-429-00	MICRO INDUCTOR 470UH	
L201	1-408-519-00	COIL, CHOKE 420UH	
L202	1-408-519-00	COIL, CHOKE 420UH	
L203	1-408-519-00	COIL, CHOKE 420UH	
L401	1-459-232-00	COIL, CORE 90UH	
L402	1-408-518-00	COIL, CHOKE 1MMH	
		TRANSISTOR	
Q001	8-729-178-54	TRANSISTOR 2SC2785	
Q002	8-729-117-54	TRANSISTOR 2SA1175	
Q003	8-729-178-54	TRANSISTOR 2SC2785	
Q005	8-729-113-32	TRANSISTOR 2SB733	
Q006	8-729-178-54	TRANSISTOR 2SC2785	
Q007	8-729-178-54	TRANSISTOR 2SC2785	
Q201	8-729-117-54	TRANSISTOR 2SA1175	
Q202	8-729-178-54	TRANSISTOR 2SC2785	
Q203	8-729-178-54	TRANSISTOR 2SC2785	
Q204	8-729-178-54	TRANSISTOR 2SC2785	
Q206	8-729-178-54	TRANSISTOR 2SC2785	
Q207	8-729-178-54	TRANSISTOR 2SC2785	
Q208	8-729-117-54	TRANSISTOR 2SA1175	
Q209	8-729-178-54	TRANSISTOR 2SC2785	
Q210	8-729-178-54	TRANSISTOR 2SC2785	
Q211	8-729-178-54	TRANSISTOR 2SC2785	
Q212	8-729-178-54	TRANSISTOR 2SC2785	
Q213	8-729-178-54	TRANSISTOR 2SC2785	
Q214	8-729-178-54	TRANSISTOR 2SC2785	
Q215	8-729-178-54	TRANSISTOR 2SC2785	
Q216	8-729-117-54	TRANSISTOR 2SA1175	
Q217	8-729-113-33	TRANSISTOR 2SB733-U2	
Q218	8-729-113-33	TRANSISTOR 2SB733-U2	
Q219	8-729-178-54	TRANSISTOR 2SC2785	
Q220	8-729-178-54	TRANSISTOR 2SC2785	
Q221	8-729-178-54	TRANSISTOR 2SC2785	
Q222	8-729-178-54	TRANSISTOR 2SC2785	
Q223	8-729-178-54	TRANSISTOR 2SC2785	
Q224	8-729-117-54	TRANSISTOR 2SA1175	
Q225	8-729-113-33	TRANSISTOR 2SB733-U2	
Q226	8-729-113-33	TRANSISTOR 2SB733-U2	
Q227	8-729-178-54	TRANSISTOR 2SC2785	

The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.

When indicating parts by reference number, please include the board name.

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Ref.No	Part No	Description	Remark
Q228	8-729-178-54	TRANSISTOR 2SC2785	
Q229	8-729-178-54	TRANSISTOR 2SC2785	
Q230	8-729-117-54	TRANSISTOR 2SA1175	
Q401	8-729-178-54	TRANSISTOR 2SC2785	
Q402	8-729-177-32	TRANSISTOR 2SD773	
Q403	8-729-113-33	TRANSISTOR 2SB733-U2	
Q404	8-729-117-54	TRANSISTOR 2SA1175	
Q405	8-729-178-54	TRANSISTOR 2SC2785	
Q406	8-729-178-54	TRANSISTOR 2SC2785	
Q407	8-729-178-54	TRANSISTOR 2SC2785	
Q408	8-729-117-54	TRANSISTOR 2SA1175	
Q409	8-729-178-54	TRANSISTOR 2SC2785	
Q411	8-729-178-54	TRANSISTOR 2SC2785	
Q415	8-729-178-54	TRANSISTOR 2SC2785	
Q421	8-729-178-54	TRANSISTOR 2SC2785	
Q422	8-729-178-54	TRANSISTOR 2SC2785	
Q424	8-729-117-54	TRANSISTOR 2SA1175	
Q426	8-729-178-54	TRANSISTOR 2SC2785	
Q601	8-729-113-32	TRANSISTOR 2SB733	
Q602	8-729-113-32	TRANSISTOR 2SB733	
Q603	8-729-178-54	TRANSISTOR 2SC2785	
Q604	8-729-178-54	TRANSISTOR 2SC2785	
Q605	8-729-117-54	TRANSISTOR 2SA1175	
Q606	8-729-113-32	TRANSISTOR 2SB733	
Q607	8-729-113-32	TRANSISTOR 2SB733	
Q608	8-729-178-54	TRANSISTOR 2SC2785	
Q609	8-729-178-54	TRANSISTOR 2SC2785	
Q610	8-729-178-54	TRANSISTOR 2SC2785	
Q611	8-729-113-32	TRANSISTOR 2SB733	
Q612	8-729-177-32	TRANSISTOR 2SD773	
Q613	8-729-113-32	TRANSISTOR 2SB733	
Q614	8-729-177-32	TRANSISTOR 2SD773	
Q615	8-729-178-54	TRANSISTOR 2SC2785	
Q616	8-729-116-42	TRANSISTOR 2SD1164	
Q618	8-729-117-54	TRANSISTOR 2SA1175	
Q619	8-729-178-54	TRANSISTOR 2SC2785	
Q623	8-729-178-54	TRANSISTOR 2SC2785	
Q624	8-729-178-54	TRANSISTOR 2SC2785	
Q625	8-729-178-54	TRANSISTOR 2SC2785	
Q631	8-729-178-54	TRANSISTOR 2SC2785	
Q634	8-729-178-54	TRANSISTOR 2SC2785	
Q801	8-729-178-54	TRANSISTOR 2SC2785	
Q803	8-729-178-54	TRANSISTOR 2SC2785	
Q805	=>8-729-113-32	TRANSISTOR 2SB733	
Q807	8-729-178-54	TRANSISTOR 2SC2785	
Q808	8-729-178-54	TRANSISTOR 2SC2785	

RESISTOR

Ref.No	Part No	Description			Remark
R001	1-246-830-00	CARBON	75	1/8W	
R002	1-246-783-00	CARBON	1K	1/8W	
R003	1-246-783-00	CARBON	1K	1/8W	
R004	1-246-783-00	CARBON	1K	1/8W	
R005	1-246-797-00	CARBON	15K	1/8W	
R006	1-246-805-00	CARBON	68K	1/8W	
R007	1-246-842-00	CARBON	750	1/8W	
R008	1-246-795-00	CARBON	10K	1/8W	
R009	1-246-783-00	CARBON	1K	1/8W	
R011	1-246-786-00	CARBON	1.8K	1/8W	
R013	1-246-834-00	CARBON	160	1/8W	
R015	1-246-779-00	CARBON	470	1/8W	
R016	1-246-783-00	CARBON	1K	1/8W	
R017	1-246-777-00	CARBON	330	1/8W	
R019	1-246-779-00	CARBON	470	1/8W	
R021	1-246-803-00	CARBON	47K	1/8W	
R022	1-246-803-00	CARBON	47K	1/8W	
R023	1-246-795-00	CARBON	10K	1/8W	
R024	1-246-798-00	CARBON	18K	1/8W	
R025	1-246-802-00	CARBON	39K	1/8W	
R026	1-246-802-00	CARBON	39K	1/8W	
R027	1-246-795-00	CARBON	10K	1/8W	
R028	1-246-803-00	CARBON	47K	1/8W	
R029	1-246-791-00	CARBON	4.7K	1/8W	
R030	1-246-856-00	CARBON	11K	1/8W	
R031	1-246-782-00	CARBON	820	1/8W	
R036	1-246-799-00	CARBON	22K	1/8W	
R037	1-246-807-00	CARBON	100K	1/8W	
R038	1-246-799-00	CARBON	22K	1/8W	
R039	1-246-804-00	CARBON	56K	1/8W	
R048	1-246-802-00	CARBON	39K	1/8W	
R049	1-246-804-00	CARBON	56K	1/8W	
R050	1-246-783-00	CARBON	1K	1/8W	
R051	1-246-801-00	CARBON	33K	1/8W	
R052	1-246-804-00	CARBON	56K	1/8W	
R053	1-246-869-00	CARBON	130K	1/8W	
R054	1-246-811-00	CARBON	220K	1/8W	
R055	1-246-802-00	CARBON	39K	1/8W	
R057	1-246-830-00	CARBON	75	1/8W	
R058	1-246-803-00	CARBON	47K	1/8W	
R059	1-246-799-00	CARBON	22K	1/8W	
R061	1-246-805-00	CARBON	68K	1/8W	
R062	1-246-863-00	CARBON	43K	1/8W	
R201	1-246-785-00	CARBON	1.5K	1/8W	
R202	1-246-785-00	CARBON	1.5K	1/8W	
R203	1-246-799-00	CARBON	22K	1/8W	
R204	1-246-799-00	CARBON	22K	1/8W	
R211	1-246-803-00	CARBON	47K	1/8W	
R214	1-247-055-00	CARBON	300K	1/8W	
R215	1-246-809-00	CARBON	150K	1/8W	
R216	1-246-807-00	CARBON	100K	1/8W	
R217	1-246-803-00	CARBON	47K	1/8W	
R218	1-246-859-00	CARBON	20K	1/8W	
R219	1-246-788-00	CARBON	2.7K	1/8W	
R220	1-246-793-00	CARBON	6.8K	1/8W	
R221	1-246-803-00	CARBON	47K	1/8W	
R222	1-246-794-00	CARBON	8.2K	1/8W	
R223	1-246-785-00	CARBON	1.5K	1/8W	

When indicating parts by reference number, please include the board name.

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Ref.No	Part No	Description				Remark
R224	1-246-847-00	CARBON	2K		1/8W	
R226	1-246-798-00	CARBON	18K		1/8W	
R227	1-246-783-00	CARBON	1K		1/8W	
R228	1-246-854-00	CARBON	7.5K		1/8W	
R229	1-246-791-00	CARBON	4.7K		1/8W	
R230	1-246-803-00	CARBON	47K		1/8W	
R231	1-246-791-00	CARBON	4.7K		1/8W	
R232	1-246-803-00	CARBON	47K		1/8W	
R236	1-246-807-00	CARBON	100K		1/8W	
R237	1-246-783-00	CARBON	1K		1/8W	
R238	1-246-799-00	CARBON	22K		1/8W	
R241	1-246-799-00	CARBON	22K		1/8W	
R242	1-246-799-00	CARBON	22K		1/8W	
R243	1-246-795-00	CARBON	10K		1/8W	
R245	1-246-449-00	CARBON	100	5%	1/4W	
R246	1-246-457-00	CARBON	220	5%	1/4W	
R255	1-244-861-00	CARBON	330	5%	1/2W	
R256	1-246-783-00	CARBON	1K		1/8W	
R257 ⚠	1-217-612-00	WIREWOUND	0.1		2W	
R258	1-246-801-00	CARBON	33K		1/8W	
R259	1-246-801-00	CARBON	33K		1/8W	
R260	1-246-860-00	CARBON	24K		1/8W	
R261	1-246-800-00	CARBON	27K		1/8W	
R264	1-247-049-00	CARBON	470K		1/8W	
R268	1-246-795-00	CARBON	10K		1/8W	
R271	1-247-057-00	CARBON	430K		1/8W	
R273	1-246-795-00	CARBON	10K		1/8W	
R294	1-246-795-00	CARBON	10K		1/8W	
R295	1-246-449-00	CARBON	100	5%	1/4W	
R296	1-246-457-00	CARBON	220	5%	1/4W	
R303	1-244-861-00	CARBON	330	5%	1/2W	
R306	1-246-783-00	CARBON	1K		1/8W	
R307	1-247-049-00	CARBON	470K		1/8W	
R308	1-246-803-00	CARBON	47K		1/8W	
R309	1-246-783-00	CARBON	1K		1/8W	
R310	1-246-811-00	CARBON	220K		1/8W	
R311	1-246-803-00	CARBON	47K		1/8W	
R312	1-246-851-00	CARBON	4.3K		1/8W	
R313	1-246-803-00	CARBON	47K		1/8W	
R314	1-246-803-00	CARBON	47K		1/8W	
R315	1-246-795-00	CARBON	10K		1/8W	
R316	1-246-803-00	CARBON	47K		1/8W	
R320	1-246-801-00	CARBON	33K		1/8W	
R321	1-246-863-00	CARBON	43K		1/8W	
R322	1-246-797-00	CARBON	15K		1/8W	
R323	1-246-798-00	CARBON	18K		1/8W	
R324	1-246-789-00	CARBON	3.3K		1/8W	
R401	1-246-783-00	CARBON	1K		1/8W	
R402	1-246-799-00	CARBON	22K		1/8W	
R404	1-246-859-00	CARBON	20K		1/8W	
R405	1-246-803-00	CARBON	47K		1/8W	
R406	1-246-797-00	CARBON	15K		1/8W	
R407	1-246-783-00	CARBON	1K		1/8W	

Ref.No	Part No	Description				Remark
R413	1-246-803-00	CARBON	47K		1/8W	
R414	1-246-801-00	CARBON	33K		1/8W	
R415	1-246-795-00	CARBON	10K		1/8W	
R416	1-246-807-00	CARBON	100K		1/8W	
R417	1-246-807-00	CARBON	100K		1/8W	
R418	1-246-801-00	CARBON	33K		1/8W	
R423	1-246-807-00	CARBON	100K		1/8W	
R424	1-246-807-00	CARBON	100K		1/8W	
R427	1-246-852-00	CARBON	5.1K		1/8W	
R428 ⚠	1-212-356-00	METAL	0.47	5%	1W	F
R429	1-246-837-00	CARBON	300		1/8W	
R430	1-246-787-00	CARBON	2.2K		1/8W	
R431	1-246-792-00	CARBON	5.6K		1/8W	
R432	1-246-803-00	CARBON	47K		1/8W	
R439	1-214-178-00	METAL	82K	1%	1/4W	
R440	1-246-807-00	CARBON	100K		1/8W	
R444	1-246-801-00	CARBON	33K		1/8W	
R445	1-246-801-00	CARBON	33K		1/8W	
R446	1-246-418-00	CARBON	5.1	5%	1/4W	
R448	1-246-783-00	CARBON	1K		1/8W	
R449	1-246-797-00	CARBON	15K		1/8W	
R450	1-246-799-00	CARBON	22K		1/8W	
R451	1-246-803-00	CARBON	47K		1/8W	
R452	1-246-769-00	CARBON	68		1/8W	
R457	1-246-800-00	CARBON	27K		1/8W	
R458	1-246-866-00	CARBON	75K		1/8W	
R459	1-246-807-00	CARBON	100K		1/8W	
R462	1-246-810-00	CARBON	180K		1/8W	
R463	1-246-801-00	CARBON	33K		1/8W	
R465	1-246-810-00	CARBON	180K		1/8W	
R472	1-246-788-00	CARBON	2.7K		1/8W	
R477	1-246-795-00	CARBON	10K		1/8W	
R478	1-246-783-00	CARBON	1K		1/8W	
R480	1-246-795-00	CARBON	10K		1/8W	
R495	1-246-795-00	CARBON	10K		1/8W	
R496	1-246-795-00	CARBON	10K		1/8W	
R504	1-246-797-00	CARBON	15K		1/8W	
R505	1-246-779-00	CARBON	470		1/8W	
R510	1-246-444-00	CARBON	62	5%	1/4W	
R513	1-246-791-00	CARBON	4.7K		1/8W	
R515	1-246-811-00	CARBON	220K		1/8W	
R516	1-246-791-00	CARBON	4.7K		1/8W	
R518	1-246-795-00	CARBON	10K		1/8W	
R522	1-214-549-00	METAL	470	1%	1/8W	
R523	1-246-791-00	CARBON	4.7K		1/8W	
R524	1-246-784-00	CARBON	1.2K		1/8W	
R525	1-246-844-00	CARBON	1.1K		1/8W	
R526	1-246-861-00	CARBON	30K		1/8W	
R527	1-246-786-00	CARBON	1.8K		1/8W	
R528	1-246-848-00	CARBON	2.4K		1/8W	
R529	1-246-779-00	CARBON	470		1/8W	
R531	1-246-787-00	CARBON	2.2K		1/8W	
R532	1-246-803-00	CARBON	47K		1/8W	

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Ref.No	Part No	Description				Remark
R537	1-246-795-00	CARBON	10K		1/8W	
R540	1-246-795-00	CARBON	10K		1/8W	
R542	1-246-844-00	CARBON	1.1K		1/8W	
R543	1-246-807-00	CARBON	100K		1/8W	
R544	1-246-795-00	CARBON	10K		1/8W	
R546	1-246-803-00	CARBON	47K		1/8W	
R547	1-246-799-00	CARBON	22K		1/8W	
R548	1-246-795-00	CARBON	10K		1/8W	
R551	1-246-799-00	CARBON	22K		1/8W	
R553	1-246-851-00	CARBON	4.3K		1/8W	
R554	1-246-799-00	CARBON	22K		1/8W	
R555	1-246-853-00	CARBON	6.2K		1/8W	
R559	1-246-795-00	CARBON	10K		1/8W	
R560	1-246-803-00	CARBON	47K		1/8W	
R561	1-246-799-00	CARBON	22K		1/8W	
R566	1-246-803-00	CARBON	47K		1/8W	
R567	1-246-783-00	CARBON	1K		1/8W	
R569	1-246-795-00	CARBON	10K		1/8W	
R570	1-246-795-00	CARBON	10K		1/8W	
R571	1-246-801-00	CARBON	33K		1/8W	
R572	1-246-862-00	CARBON	36K		1/8W	
R573	1-246-858-00	CARBON	16K		1/8W	
R574	1-246-805-00	CARBON	68K		1/8W	
R575	1-246-791-00	CARBON	4.7K		1/8W	
R580	1-246-792-00	CARBON	5.6K		1/8W	
R581	1-246-792-00	CARBON	5.6K		1/8W	
R601	1-246-457-00	CARBON	220	5%	1/4W	
R602	1-246-457-00	CARBON	220	5%	1/4W	
R603	1-246-795-00	CARBON	10K		1/8W	
R604	1-246-783-00	CARBON	1K		1/8W	
R605 ⚠	1-246-413-00	CARBON	3.3	5%	1/4W	F
R606	1-246-803-00	CARBON	47K		1/8W	
R607	1-246-457-00	CARBON	220	5%	1/4W	
R608	1-246-457-00	CARBON	220	5%	1/4W	
R609	1-246-795-00	CARBON	10K		1/8W	
R610	1-246-795-00	CARBON	10K		1/8W	
R611	1-246-795-00	CARBON	10K		1/8W	
R612	1-246-795-00	CARBON	10K		1/8W	
R613	1-246-789-00	CARBON	3.3K		1/8W	
R614	1-246-789-00	CARBON	3.3K		1/8W	
R615	1-246-799-00	CARBON	22K		1/8W	
R616	1-246-789-00	CARBON	3.3K		1/8W	
R617	1-246-843-00	CARBON	910		1/8W	
R618 ⚠	1-247-587-00	CARBON	0.47	5%	1/4W	
R619	1-246-789-00	CARBON	3.3K		1/8W	
R620	1-246-843-00	CARBON	910		1/8W	
R622	1-246-801-00	CARBON	33K		1/8W	
R623	1-246-800-00	CARBON	27K		1/8W	
R625	1-246-799-00	CARBON	22K		1/8W	
R626	1-246-799-00	CARBON	22K		1/8W	
R627	1-246-801-00	CARBON	33K		1/8W	
R628	1-246-865-00	CARBON	62K		1/8W	
R629	1-246-801-00	CARBON	33K		1/8W	
R630	1-246-801-00	CARBON	33K		1/8W	
R631	1-246-801-00	CARBON	33K		1/8W	
R639	1-246-791-00	CARBON	4.7K		1/8W	
R640	1-246-781-00	CARBON	680		1/8W	
R641	1-246-807-00	CARBON	100K		1/8W	
R642	1-246-795-00	CARBON	10K		1/8W	
R643	1-246-795-00	CARBON	10K		1/8W	
R644	1-247-053-00	CARBON	1M		1/8W	
R645	1-246-801-00	CARBON	33K		1/8W	
R646	1-246-787-00	CARBON	2.2K		1/8W	
R647	1-246-787-00	CARBON	2.2K		1/8W	
R649	1-246-787-00	CARBON	2.2K		1/8W	
R650	1-246-795-00	CARBON	10K		1/8W	
R651	1-246-795-00	CARBON	10K		1/8W	
R653	1-246-795-00	CARBON	10K		1/8W	
R654	1-246-795-00	CARBON	10K		1/8W	
R655	1-247-047-00	CARBON	330K		1/8W	
R660	1-246-795-00	CARBON	10K		1/8W	
R661	1-246-801-00	CARBON	33K		1/8W	
R663	1-246-799-00	CARBON	22K		1/8W	
R671	1-246-795-00	CARBON	10K		1/8W	
R672	1-246-803-00	CARBON	47K		1/8W	
R673	1-246-804-00	CARBON	56K		1/8W	
R674	1-246-795-00	CARBON	10K		1/8W	
R675	1-246-790-00	CARBON	3.9K		1/8W	
R676	1-246-859-00	CARBON	20K		1/8W	
R678	1-246-795-00	CARBON	10K		1/8W	
R803	1-246-795-00	CARBON	10K		1/8W	
R805	1-246-801-00	CARBON	33K		1/8W	
R806	1-246-789-00	CARBON	3.3K		1/8W	
R807	1-246-801-00	CARBON	33K		1/8W	
R810	1-246-803-00	CARBON	47K		1/8W	
R811	1-246-795-00	CARBON	10K		1/8W	
R812	1-246-807-00	CARBON	100K		1/8W	
R813	1-246-469-00	CARBON	680	5%	1/4W	
R814	1-246-807-00	CARBON	100K		1/8W	
R821	1-246-783-00	CARBON	1K		1/8W	
R827	1-246-795-00	CARBON	10K		1/8W	
R901	1-246-783-00	CARBON	1K		1/8W	
R902	1-246-783-00	CARBON	1K		1/8W	
R903	1-246-799-00	CARBON	22K		1/8W	
R904	1-246-871-00	CARBON	200K		1/8W	
R905	1-246-871-00	CARBON	200K		1/8W	
R906	1-246-807-00	CARBON	100K		1/8W	
R907	1-246-799-00	CARBON	22K		1/8W	
R908	1-246-859-00	CARBON	20K		1/8W	
R909	1-246-859-00	CARBON	20K		1/8W	
R910	1-246-785-00	CARBON	1.5K		1/8W	
R911	1-246-787-00	CARBON	2.2K		1/8W	
R920	1-246-789-00	CARBON	3.3K		1/8W	
R921	1-246-796-00	CARBON	12K		1/8W	
R922	1-246-793-00	CARBON	6.8K		1/8W	
R923	1-246-791-00	CARBON	4.7K		1/8W	

The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.

When indicating parts by reference number, please include the board name.

Ref.No	Part No	Description			Remark
R924	1-246-807-00	CARBON	100K	1/8W	
R926	1-246-797-00	CARBON	15K	1/8W	
R927	1-246-787-00	CARBON	2.2K	1/8W	
R928	1-246-810-00	CARBON	180K	1/8W	
R929	1-246-792-00	CARBON	5.6K	1/8W	
R930	1-246-799-00	CARBON	22K	1/8W	

VARIABLE RESISTOR

Ref.No	Part No	Description
RV001	1-226-774-00	RES, ADJ, METAL GLAZE 47K
RV002	1-226-702-00	RES, ADJ, METAL GLAZE 2.2K
RV003	1-226-774-00	RES, ADJ, METAL GLAZE 47K
RV004	1-226-771-00	RES, ADJ, METAL GLAZE 1K
RV005	1-226-774-00	RES, ADJ, METAL GLAZE 47K
RV006	1-226-703-00	RES, ADJ, METAL GLAZE 10K
RV007	1-226-772-00	RES, ADJ, METAL GLAZE 4.7K
RV201	1-226-774-00	RES, ADJ, METAL GLAZE 47K
RV202	1-226-773-00	RES, ADJ, METAL GLAZE 22K
RV401	1-226-753-00	RES, ADJ, SOLID 47K
RV402	1-224-254-XX	RES, ADJ, METAL GLAZE 47K
RV403	1-226-753-00	RES, ADJ, SOLID 47K
RV405	1-226-703-00	RES, ADJ, METAL GLAZE 10K
RV407	1-226-703-00	RES, ADJ, METAL GLAZE 10K
RV409	1-226-703-00	RES, ADJ, METAL GLAZE 10K
RV410	1-226-771-00	RES, ADJ, METAL GLAZE 1K
RV413	1-226-774-00	RES, ADJ, METAL GLAZE 47K
RV414	1-226-753-00	RES, ADJ, SOLID 47K
RV415	1-226-774-00	RES, ADJ, METAL GLAZE 47K
RV416	1-226-702-00	RES, ADJ, METAL GLAZE 2.2K
RV417	1-226-702-00	RES, ADJ, METAL GLAZE 2.2K
RV420	1-226-702-00	RES, ADJ, METAL GLAZE 2.2K
RV601	1-226-711-00	RES, ADJ, SOLID 22K

RELAY

Ref.No	Part No	Description
RY801	1-515-323-00	RELAY

THERMISTOR

Ref.No	Part No	Description
TH201	1-800-200-00	THERMISTOR S-3K
TH401	1-800-200-00	THERMISTOR S-3K

CRYSTAL

Ref.No	Part No	Description
X601	1-527-822-00	OSCILLATOR, CERAMIC 4.00MS

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♦:A-6717-251-A FR-4 BOARD, COMPLETE
****

Ref.No	Part No	Description
	1-548-562-00	COUNTER MODULE, TAPE
	♦:2-283-410-00	HOLDER (A), LED
	♦:3-670-095-00	HOLDER, LED

CAPACITOR

Ref.No	Part No	Description			Remark
C001	1-123-611-00	ELECT	1MF	20%	50V
C002	1-161-013-00	CERAMIC	0.01MF	10%	25V
C003	1-123-618-00	ELECT	22MF	20%	6.3V
C004	1-161-013-00	CERAMIC	0.01MF	10%	25V
C005	1-161-017-00	CERAMIC	0.022MF	10%	25V
C006	1-123-617-00	ELECT	10MF	20%	16V
C007	1-161-013-00	CERAMIC	0.01MF	10%	25V
C008	1-101-006-00	CERAMIC	0.047MF		50V
C009	1-161-021-00	CERAMIC	0.047MF	10%	25V
C010	1-161-020-00	CERAMIC	0.039MF	10%	25V
C011	1-161-039-00	CERAMIC	0.001MF	10%	25V
C012	1-161-039-00	CERAMIC	0.001MF	10%	25V
C013	1-161-039-00	CERAMIC	0.001MF	10%	25V
C014	1-161-039-00	CERAMIC	0.001MF	10%	25V
C015	1-161-013-00	CERAMIC	0.01MF	10%	25V
C016	1-123-616-11	ELECT	4.7MF	20%	25V
C017	1-161-025-00	CERAMIC	0.1MF	10%	25V

CONNECTOR

Ref.No	Part No	Description
CN001	♦:1-560-569-00	PIN, CONNECTOR 11P
CN002	♦:1-560-570-00	PIN, CONNECTOR 4P

DIODE

Ref.No	Part No	Description
D001	=>8-719-914-33	DIODE PG3432SY
D002	8-719-130-07	DIODE RD3.0E-B
D006	8-719-113-07	DIODE RD13E-B
D007	8-719-113-07	DIODE RD13E-B
D008	8-719-113-07	DIODE RD13E-B
D009	8-719-113-07	DIODE RD13E-B
D010	8-719-113-07	DIODE RD13E-B
D011	8-719-113-07	DIODE RD13E-B
D012	8-719-113-07	DIODE RD13E-B
D013	8-719-113-07	DIODE RD13E-B
D014	8-719-113-07	DIODE RD13E-B
D015	8-719-113-07	DIODE RD13E-B
D017	8-719-113-07	DIODE RD13E-B
D018	8-719-911-06	DIODE 1SS106
D019	8-719-911-06	DIODE 1SS106
D021	=>8-719-914-02	DIODE BR3402S
D022	=>8-719-903-42	DIODE AY3432S
D023	=>8-719-903-42	DIODE AY3432S
D024	=>8-719-903-42	DIODE AY3432S
D025	=>8-719-934-34	DIODE AA3432S
D026	=>8-719-914-33	DIODE PG3432SY
D027	=>8-719-914-02	DIODE BR3402S
D028	8-719-118-07	DIODE RD18E-B
D029	8-719-113-07	DIODE RD13E-B
D031	=>8-719-901-33	DIODE 1SS133
D036	8-719-911-06	DIODE 1SS106

IC

Ref.No	Part No	Description
IC001	8-759-986-39	IC MB8855-139
IC002	8-759-987-47	IC MB8747

When indicating parts by reference number, please include the board name.

FR-4 EH-3 LM-8 LM-10

TRANSISTOR

Ref.No	Part No	Description				Remark
Q001	8-729-178-54	TRANSISTOR 2SC2785				
Q002	8-729-178-54	TRANSISTOR 2SC2785				
Q003	8-729-178-54	TRANSISTOR 2SC2785				
Q004	8-729-178-54	TRANSISTOR 2SC2785				
Q005	8-729-902-11	TRANSISTOR 2SC2021				
Q006	8-729-902-11	TRANSISTOR 2SC2021				
Q007	8-729-178-54	TRANSISTOR 2SC2785				
Q008	8-729-178-54	TRANSISTOR 2SC2785				
Q009	8-729-902-11	TRANSISTOR 2SC2021				
Q010	8-729-902-11	TRANSISTOR 2SC2021				
Q011	8-729-902-11	TRANSISTOR 2SC2021				
Q012	8-729-902-11	TRANSISTOR 2SC2021				
Q013	8-729-902-11	TRANSISTOR 2SC2021				
Q014	8-729-178-54	TRANSISTOR 2SC2785				
Q015	8-729-178-54	TRANSISTOR 2SC2785				
Q016	8-729-902-11	TRANSISTOR 2SC2021				
Q017	8-729-902-11	TRANSISTOR 2SC2021				
Q018	8-729-902-11	TRANSISTOR 2SC2021				

RESISTOR

Ref.No	Part No	Description				Remark
R001	1-246-783-00	CARBON	1K		1/8W	
R002	1-246-789-00	CARBON	3.3K		1/8W	
R003	1-246-799-00	CARBON	22K		1/8W	
R004	1-246-803-00	CARBON	47K		1/8W	
R005	1-246-801-00	CARBON	33K		1/8W	
R006	1-246-795-00	CARBON	10K		1/8W	
R007	1-246-801-00	CARBON	33K		1/8W	
R008	1-246-799-00	CARBON	22K		1/8W	
R009	1-246-799-00	CARBON	22K		1/8W	
R010	1-246-799-00	CARBON	22K		1/8W	
R011	1-246-799-00	CARBON	22K		1/8W	
R012	1-246-854-00	CARBON	7.5K		1/8W	
R013	1-246-854-00	CARBON	7.5K		1/8W	
R014	1-246-801-00	CARBON	33K		1/8W	
R015	1-246-801-00	CARBON	33K		1/8W	
R016	1-246-801-00	CARBON	33K		1/8W	
R017	1-246-777-00	CARBON	330		1/8W	
R018	1-246-781-00	CARBON	680		1/8W	
R019	1-246-777-00	CARBON	330		1/8W	
R020	1-246-795-00	CARBON	10K		1/8W	
R021	1-246-801-00	CARBON	33K		1/8W	
R022	1-246-801-00	CARBON	33K		1/8W	
R023	1-246-801-00	CARBON	33K		1/8W	
R024	1-246-801-00	CARBON	33K		1/8W	
R025	1-244-857-00	CARBON	220	5%	1/2W	
R026	1-246-801-00	CARBON	33K		1/8W	
R027	1-246-801-00	CARBON	33K		1/8W	
R029	1-246-807-00	CARBON	100K		1/8W	
R030	1-246-800-00	CARBON	27K		1/8W	
R031	1-246-795-00	CARBON	10K		1/8W	
R033	1-244-857-00	CARBON	220	5%	1/2W	
R040	1-246-795-00	CARBON	10K		1/8W	

VARIABLE RESISTOR

Ref.No	Part No	Description				Remark
RV001	1-228-603-00	RES, VAR, CARBON 100K				

SWITCH

Ref.No	Part No	Description				Remark
S001	1-553-766-00	SWITCH, KEY BOARD				
S002	1-553-766-00	SWITCH, KEY BOARD				
S003	1-553-766-00	SWITCH, KEY BOARD				
S004	1-553-766-00	SWITCH, KEY BOARD				
S005	1-553-766-00	SWITCH, KEY BOARD				
S006	1-553-766-00	SWITCH, KEY BOARD				
S007	1-553-766-00	SWITCH, KEY BOARD				
S008	1-553-766-00	SWITCH, KEY BOARD				
S009	1-553-766-00	SWITCH, KEY BOARD				
S010	1-553-766-00	SWITCH, KEY BOARD				
S011	1-553-766-00	SWITCH, KEY BOARD				
S012	1-553-766-00	SWITCH, KEY BOARD				
S013	1-553-766-00	SWITCH, KEY BOARD				
S014	1-553-766-00	SWITCH, KEY BOARD				
S015	1-553-766-00	SWITCH, KEY BOARD				
S016	1-553-766-00	SWITCH, KEY BOARD				
S017	1-553-766-00	SWITCH, KEY BOARD				
S018	1-553-716-00	SWITCH, SLIDE				

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♠:1-607-162-00 EH-3 BOARD
****

JACK

Ref.No	Part No	Description				Remark
J910	1-507-251-XX	JACK				

****

♠:1-605-071-00 LM-8 BOARD
****

CAPACITOR

Ref.No	Part No	Description				Remark
C001	1-161-057-00	CERAMIC	0.033MF	10%	50V	
C002	1-161-057-00	CERAMIC	0.033MF	10%	50V	

COIL

Ref.No	Part No	Description				Remark
L001	1-408-120-00	MICRO INDUCTOR 18UH				
L002	1-408-120-00	MICRO INDUCTOR 18UH				

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1-605-664-00 LM-10 BOARD
****

RESISTOR

Ref.No	Part No	Description				Remark
R001	1-206-479-00	METAL	47	5%	2W	F

When indicating parts by reference number, please include the board name.

Ref.No	Part No	Description			Remark
	●:1-606-731-00	SL-3 BOARD **********			

CAPACITOR

Ref.No	Part No	Description			Remark
C001	1-102-960-00	CERAMIC 24PF	5%		50V
C002	1-102-960-00	CERAMIC 24PF	5%		50V
C003	1-161-021-00	CERAMIC 0.047MF	10%		25V
C004	1-161-021-00	CERAMIC 0.047MF	10%		25V
C005	1-102-948-00	CERAMIC 11PF	5%		50V
C006	1-161-013-00	CERAMIC 0.01MF	10%		25V
C007	1-123-645-00	ELECT 33MF	20%		10V
C008	1-161-021-00	CERAMIC 0.047MF	10%		25V

DIODE

Ref.No	Part No	Description
D001	=>8-719-911-19	DIODE 1SS119
D002	=>8-719-911-19	DIODE 1SS119

IC

Ref.No	Part No	Description
IC001	8-759-200-60	IC TA7060AP

COIL

Ref.No	Part No	Description
L001	1-408-415-00	MICRO INDUCTOR 33UH
L002	1-408-408-00	MICRO INDUCTOR 8.2UH

RESISTOR

Ref.No	Part No	Description		
R001	1-246-782-00	CARBON	820	1/8W
R002	1-246-782-00	CARBON	820	1/8W
R003	1-246-783-00	CARBON	1K	1/8W
R004	1-246-783-00	CARBON	1K	1/8W

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MISCELLANEOUS
****

Part No	Description
A-6737-090-A	MOTOR ASSY, L
⚠ **A-6749-058-A**	**SOLENOID BLOCK ASSY, PINCH**
A-6761-045-A	ACE ASSY (M-3)
1-235-054-00	COIL, SENSOR, S
1-235-055-00	COIL, SENSOR, T
1-446-961-00	HEATER, PTC
⚠ **1-454-281-00**	**SOLENOID, PLUNGER**
1-464-186-00	RP BLOCK (RP-1-P-2)
1-553-717-00	SWITCH, MICRO
1-553-718-00	SWITCH, MICRO
1-605-077-00	FC-1 BOARD
1-605-078-00	FC-3 BOARD
1-806-354-00	SENSOR, DEW CONDENSATION
8-825-508-10	HEAD, FE
8-838-021-02	MOTOR, DC (BHF-1800A)
8-838-027-00	MOTOR, DC (BHF-1901A)

ACCESSORIES AND PACKING MATERIALS
****

Part.No	Description	Remark
1-504-059-11	MAGNETIC EARPHONE(ME-20H)	
1-551-513-00	CABLE, COAXAL ASSY	
3-656-301-00	SCREWDRIVER, CONTROL	
3-669-635-00	BAG, PROTECTION	
3-671-419-03	LID, CASE, ACCESSORY	
3-671-424-00	CASE, ACCESSORY	
3-672-323-00	INDIVIDUAL CARTON	
3-672-325-00	CUSHION (LEFT UPPER)	
3-672-326-00	CUSHION (RIGHT UPPER)	
3-672-327-00	CUSHION (LEFT LOWER)	
3-672-328-00	CUSHION (RIGHT LOWER)	
3-701-628-00	BAG, POLYETHYLENE	
3-701-630-00	BAG, POLYETHYLENE	
3-783-868-11	MANUAL, INSTRUCTION	
3-795-507-41	NOTICE (Chinese Model)	
X-3669-375-0	SHOULDER STRAP	

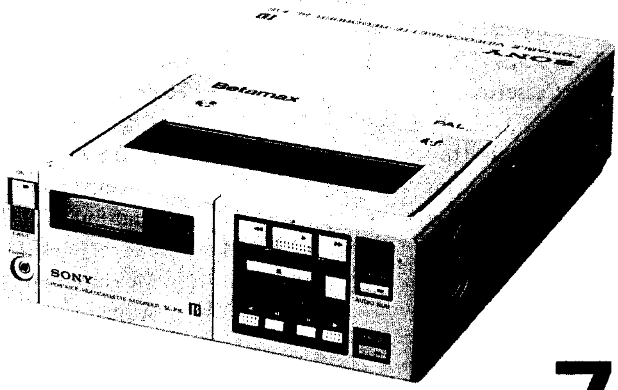
The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.

When indicating parts by reference number, please include the board name.

SL-F1E

ADJUSTMENT MANUAL

AEP Model
UK Model
E Model



711P CHASSIS

July, 1982

SPECIFICATIONS

System

Video recording system	Rotary two-head helical scanning
Video signal	CCIR standard, PAL colour
RF output signal	UHF channels 30–39 (variable) 75 ohms, unbalanced
Usable cassettes	Cassettes with the β mark
Tape speed	18.73 mm/sec.
Maximum recording time	2 hours 10 min. (with Sony L-500 cassette) 3 hours 15 min. (with Sony L-750 cassette)
Fast forward/rewind time	Under 3½ min. (with L-500 cassette)
Horizontal resolution	Colour: 260 lines B/W: 300 lines
Video S/N	Colour: Better than 40 dB B/W: Better than 43 dB
Audio frequency response	50 Hz to 10 000 Hz
Audio S/N	Better than 40 dB

Inputs and outputs

CAMERA connector	14-pin, K-type connector
	Video in: 1 V p-p ±0.5 V p-p 75 ohms unbalanced, sync negative
	Video out: 1 V p-p ±0.1V p-p 75 ohm unbalanced, sync negative
	Audio in: −20 dBs (0 dBs = 0.775 V rms)
	Audio out: −5 dBs (at load impedance 100 kilohms) output impedance: less than 10 kilohms
	Power supply output: 12 V dc
ACCESSORY CONNECTOR	26-pin connector
	Video in: 1 V p-p ±0.5 V p-p 75 ohms unbalanced, sync negative
	Video out: 1 V p-p ±0.1 V p-p 75 ohms unbalanced, sync negative
	Audio in: −10 dBs input impedance 100 kilohms
	Audio out: −5 dBs (at load impedance 100 kilohms) output impedance: less than 10 kilohms
	Power supply input: 12 V dc
Microphone input	Minijack −60 dBs, for low-impedance microphone
Earpiece output	Minijack −26 dBs, for 8-ohm earpiece

General

Power requirements	12 V dc ±10%
Power consumption	8.4 W (dc, record mode without camera)
Operating position	vertical or horizontal
Operating temperature	0°C to 40°C (32°F to 104°F)
Storage temperature	−20°C to +65°C (−4°F to +149°F)
Dimensions	Approx: 215 × 80 × 325 mm (w/h/d) (8½ × 3¼ × 12⅞ inches) not incl. projecting parts and controls
Weight	Approx. 4.3 kg (9 lb 8 oz) net

Beta
β PORTABLE VIDEO CASSETTE RECORDER

SONY®

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SECTION 1

CHECKING, ALIGNMENT AND REPLACEMENT OF MECHANICAL SECTION

1-1. REMOVAL OF THE CASE

1-1-1. Removal of Panel Assembly (Fig. 1-1)

1) Raise the cassette compartment.

2) Unscrew the two screws ① on the cassette compartment cover and remove the cover by pulling it upward in the direction of arrow Ⓐ.

3) Unscrew the four screws ③ on the lower panel assembly and remove it.

4) Unscrew the two screws ② on the upper panel assembly and disconnect the battery connector.

5) Remove the upper panel assembly by lifting it in the direction of arrow Ⓑ.

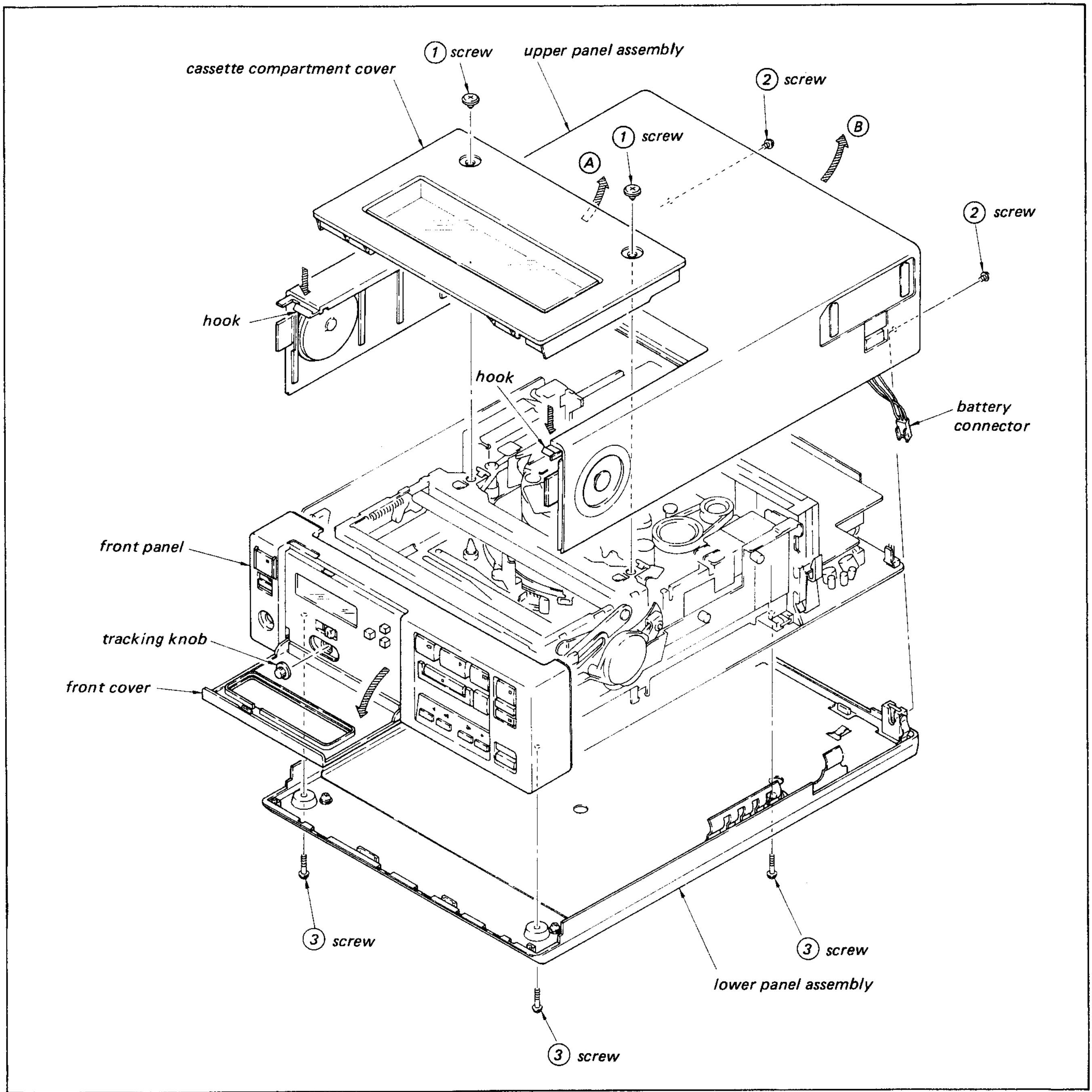

① screw
upper panel assembly
cassette compartment cover
② screw
① screw
Ⓐ
Ⓑ
② screw
hook
hook
battery connector
front panel
tracking knob
front cover
③ screw
③ screw
lower panel assembly
③ screw

Fig. 1-1. Removal of panel assembly

1-1-2. Removal of Front Panel (Fig. 1-2)

1) Open the front cover and pull out the tracking knob. (Fig. 1-1)
2) Disengage the four hooks Ⓐ by pushing them outward. Disengage the four hooks Ⓑ, pull the panel down in the dierection indicated by the arrow ⓐ, then forward together with the circuit board.
3) Disconnect the wire harness connector from the LS-8 board.
4) Insert a blade-tip screwdriver between the front panel and FR-4 board and disengage the four hooks Ⓓ while pushing hook Ⓒ down by hand.

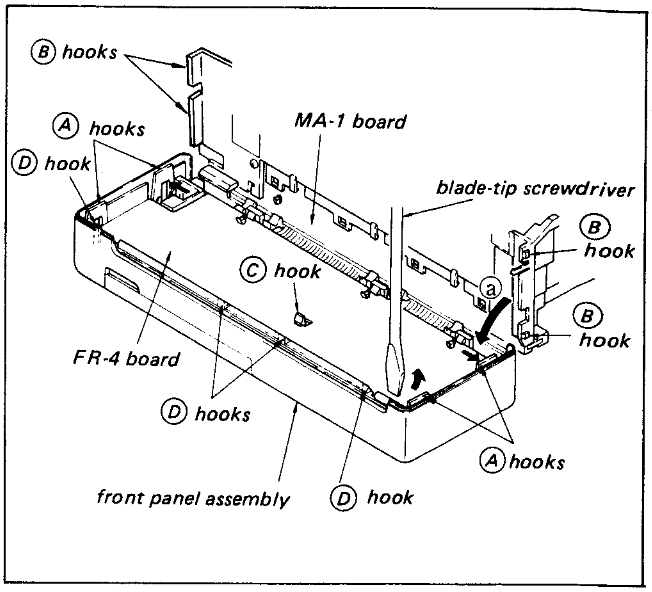

Ⓑ hooks
Ⓐ hooks
Ⓓ hook
MA-1 board
blade-tip screwdriver
Ⓑ hook
Ⓒ hook
ⓐ
Ⓑ hook
FR-4 board
Ⓓ hooks
Ⓐ hooks
front panel assembly
Ⓓ hook

Fig. 1-2. Removal of front panel

1-1-3. Removal of the Mechanism Chassis (Fig. 1-3)

1) Remove the front panel (see Fig. 1-1-2)
2) Disconnect the connectors from the MA-3 board.
3) Disengage the two hooks Ⓐ fixing the LS-8 board. Pull out
4) Unscrew the screw ① and remove the earth panel plate.
5) Unscrew the four screws ② on the rear of the MA-3 board.

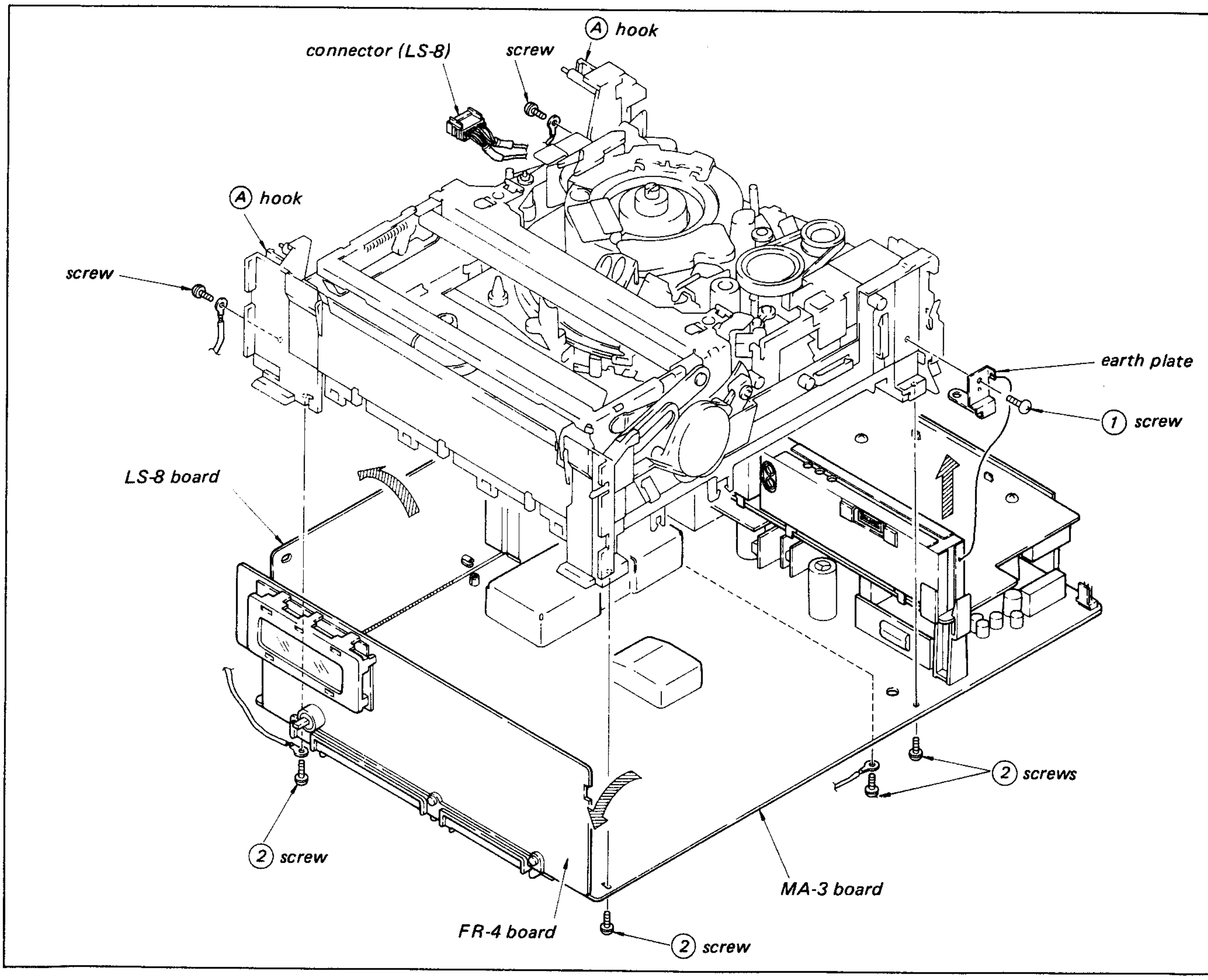

Ⓐ hook
connector (LS-8)
screw
Ⓐ hook
screw
earth plate
① screw
LS-8 board
② screws
② screw
MA-3 board
FR-4 board
② screw

Fig. 1-3. Removal of the mechanism chassis

1-2. PRECAUTIONS WHEN SERVICING

1. Attention should be paid to the positioning of the set when working with the case removed and circuit boards dismounted.
2. When making an operation check or electrical adjustment, use AC adapter AC-F1E or battery NP-1.
3. Do not use alignment tapes other than KR5-2H.

1-3. MECHANICAL OPERATION WITHOUT CASSETTE INSTALLED

1-3-1. Completing Threading Without Cassette (This state is called "STOP mode" in this guide.)

1) Depress the cassette detection lever shown in Fig. 1-4 while lowering the cassette compartment.

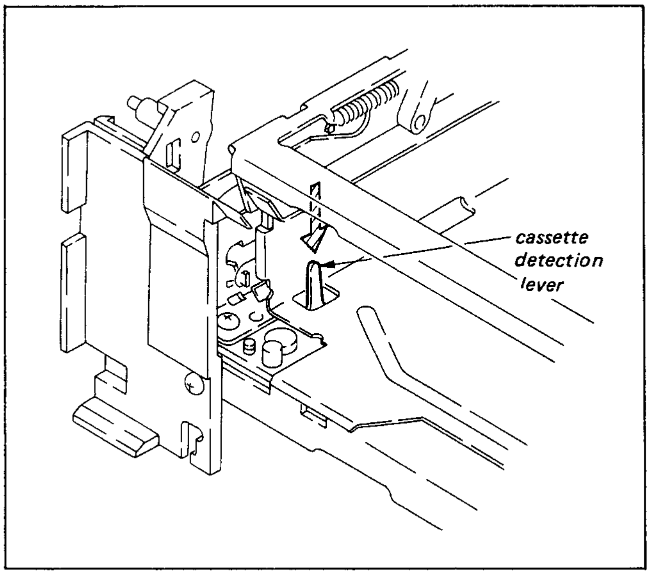


Fig. 1-4. Cassette detection lever

2) With the cassette compartment raised, push the lock lever in Fig. 1-5 using a blade-tip screwdriver, or other tool to lock the cassette compartment, then press the cassette detection lever.

Caution: The cassette compartment lock does not release automatically. Pull the release slide panel in the direction of arrow Ⓐ and push the lock lever assembly in the same direction to return it to its previous state.

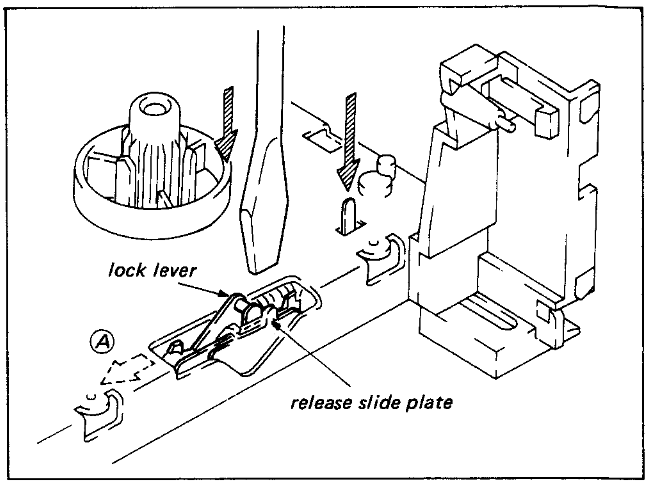


Fig. 1-5. Cassette compartment lock

1-3-2. Setting Playback Without Cassette Installed

Press the playback button after setting the STOP mode in step 1-3-1.

1-3-3. Setting Record Mode without a Cassette

1) Thread as explained in 1-3-1 and press the record proof switch as shown in Fig. 1-6.

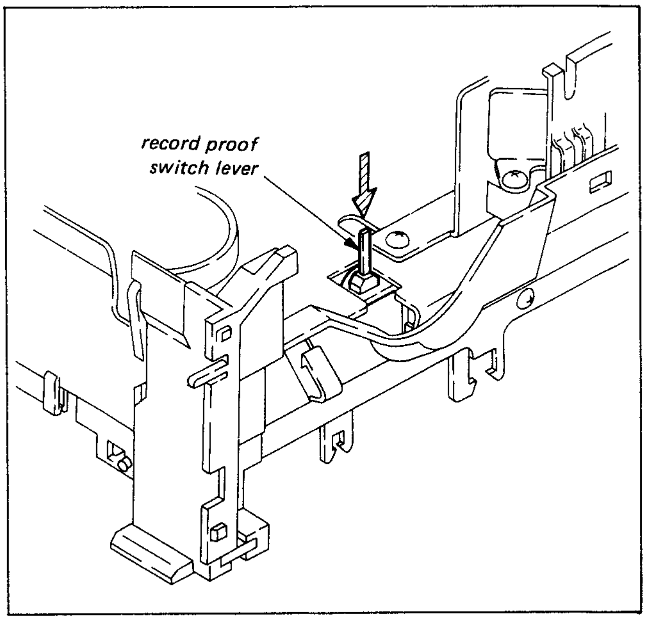


Fig. 1-6. Record proof switch

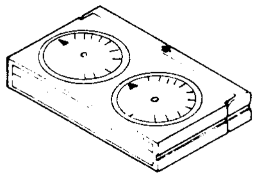
2) Press the PB button while pressing the record or dubbing button, while continuously holding down the record proof switch.

Note: The pause lamp and record lamp light when the record button is pressed, and it is necessary to release pause. Caution: fast-forward and rewind are not possible without a cassette installed.

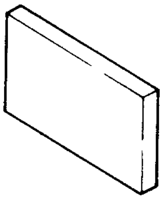
1-4. LIST OF SERVICE UNITS AND TOOLS FOR SL-F1E

Ref. No.	Name	Cord No.	Fixture No.
J-1	Forward-Back Tension Measurement Tape	J-6080-003-C	SL-0003C
J-2	Parallel Plate	J-6086-570-A	SL-0657
J-3	Small Adj. Mirror Spare Mirror	J-6080-029-A J-6080-030-1	SL-5052
J-4	Alignment Tape	8-969-995-52	KR5-2H
J-5	Cleaning Fluid	Y-2031-001-0	
J-6	Thickness Gauge	9-911-053-00	
J-7	Head Demagnetizer	Readily available	
J-8	Lapping Tape	8-888-004-00	
J-9	Cleaning Piece	2-034-697-00	
J-10	Dihedral Adj. Screw	J-6080-013-A	SL-0013

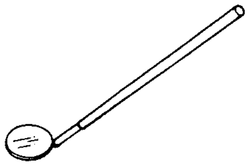
J-1



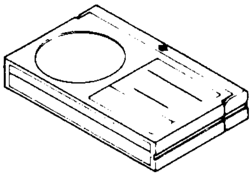
J-2



J-3

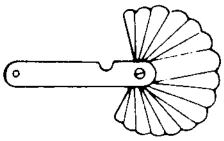


J-4

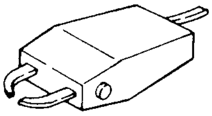


J-5

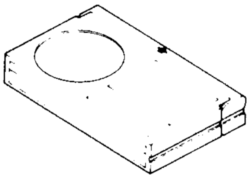
J-6



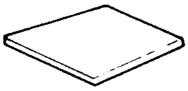
J-7



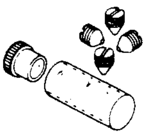
J-8



J-9



J-10



SECTION 2
PERIODIC CHECK AND MAINTENANCE

The following maintenance and periodic checks are recommended to ensure optimum machine function and performance and to prolong machine and tape life.

2-1. MAINTENANCE AFTER REPAIR

Carry out maintenance work for the following items after repairing the machine regardless of the period of use.

2-1-1. Rotary Head Disc Assembly

1) Place a piece of chamois (tool Ref. No. J9) soaked in cleaning fluid (tool Ref. No. J5) lightly against the rotary drum assembly and clean the rotary head disc assembly by slowly rotating it by hand. (Important-Do not clean by rotating with the motor on.)
2) Do not clean the head tip by moving the chamois in a vertical direction. This may damage the head tip.

2-1-2. Cleaning of the Tape Transportation System

Clean the tape contact surfaces, such as the tape guide, drum assembly surfaces, capstan, and pinch roller using cleaning piece etc. soaked in cleaning fluid.

2-1-3. Cleaning of the Drive System

Clean the driving elements (threading motor belt, reel base surfaces, etc.) using a cloth soaked in cleaning fluid.

2-2. PERIODIC CHECK ITEMS

Carry out maintenance checks for the following items depending on the duration of use.

Maintenance & Check		Replacement Part No.	Operating Hours (H)										Remarks
			500	1,000	1,500	2,000	2,500	3,000	3,500	4,000	4,500	5,000	
Tape Trans-Portation System	Cleaning of tape transportation system		○	○	○	○	○	○	○	○	○	○	This cleaning must be done whenever a repair is made.
	Cleaning and degaussing of ACE assembly		○	○	○	○	○	○	○	○	○	○	
	Cleaning and degaussing of video disk assembly		○	○	○	○	○	○	○	○	○	○	The life of the head varies, depending on operational conditions and method.
Driving System	Replacement of threading DC motor belt		○	○	○	○	○	○	○	★	○	○	• This cleaning must be done whenever a repair is made. • Replacement must be done depending on operating hours on the table, or every two years.
	Cleaning of iron core and opening of solenoid		–	–	–	○	–	–	–	○	–	–	Wipe iron core and opening of solenoid with dry cloth.
Performance Confirmation	Abnormal sound		☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	Adjust or replace the section which causes abnormal sound.
	Measurement of FWD back tension		–	☆	–	☆	–	☆	–	☆	–	☆	Confirmation must be made according to section Specified value: 45 ~ 48 g·cm (When measured with torque cassette tape)
	Confirmation of brake system		–	☆	–	☆	–	☆	–	☆	–	☆	Confirmation must be made according to section
	Confirmation of record & playback functions		☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	Perform the confirmation whenever repair is made.

○ Cleaning ★ Replacement ☆ Confirmation

SECTION 3
CHECK, ADJUSTMENT AND REPLACEMENT PROCEDURES

3-1. REPLACEMENT OF VIDEO HEAD DISC ASSEMBLY (Fig. 3-1)

3-1-1. Removal of the Rotary Head Disc Assembly

1) Unscrew the screw ① which fixes the PTC heater cover and remove the PTC heater cover and the stay.

2) Unscrew hexagonal socket bolt ② using an Allen wrench.

3) Unscrew the two fixed screws ③ and remove the damper.

4) Unscrew the two screws ④ and remove the upper drum.

Note: Remove the upper drum while rotating it without moving the adjust plate. Be very careful not to move the adjust plate, otherwise the tape path will be affected.

5) Unsolder the rotary head disc circuit board (four red-and-white lead wires).

6) Unscrew the two hexagonal socket bolt and remove the rotary head disc assembly.

Note: Be very careful not to touch the head tip, or touch it against anything.

3-1-2. Replacement

1) Position the rotary head disc paying attention to the direction of the red and white lead wires.

2) Tighten the hexagonal socket bolt and solder the lead wires.

Note: Solder securely, being careful not to break the lead wires.

3) Be careful not to move the adjust plate, as when removing the upper drum. Lightly tighten the screws ④, clamp hexagonal socket bolt , then securely tighten the screws ④.

Caution: Be careful not to touch the upper drum or the head tip.

4) Attach the damper and fix the screws ③.

5) Attach the PTC heater cover and fix the screw ①.

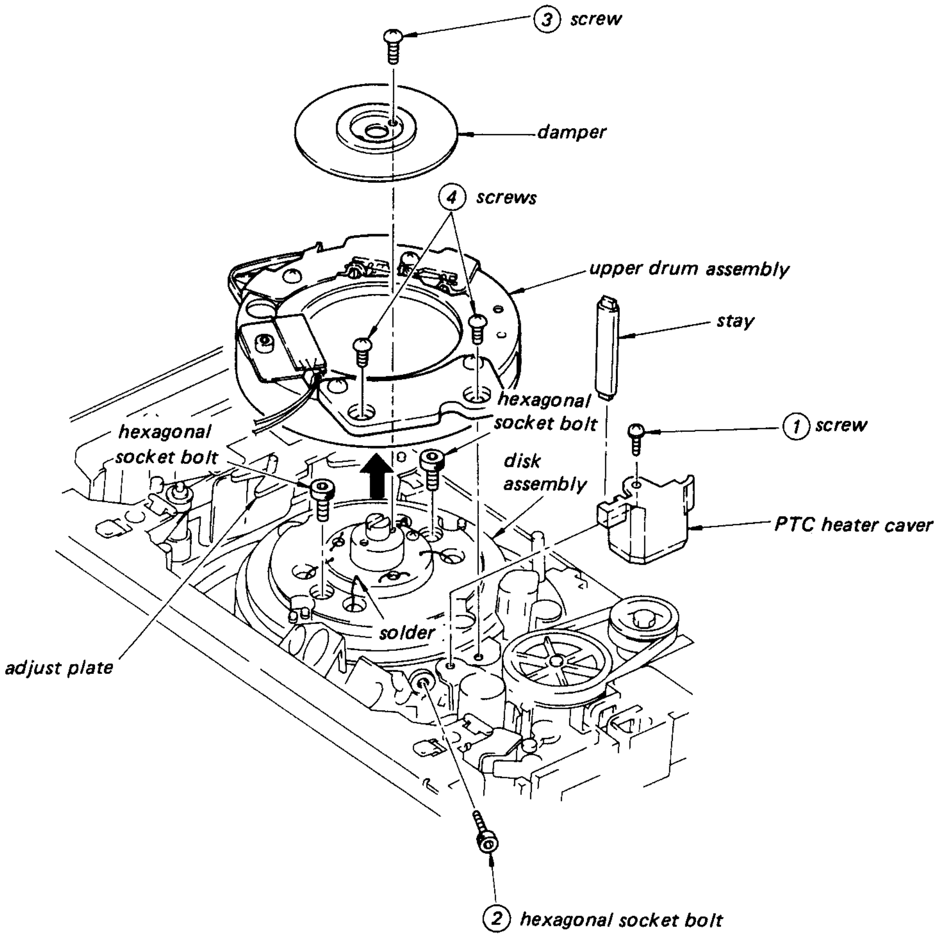

③ screw
damper
④ screws
upper drum assembly
stay
hexagonal socket bolt
hexagonal socket bolt
① screw
disk assembly
PTC heater caver
solder
adjust plate
② hexagonal socket bolt

Fig. 3-1. Removal of video head disc assembly

3-2. VIDEO HEAD DIHEDRAL ADJUSTMENT

Generally this adjustment is not necessary except after video head disc replacement. (Video head discs for repair and replacement are precision adjusted using a microscope, and there is virtually never a need for readjustment.)

When determining the appropriate video head angle, play back an alignment tape. Make sure the tracking control knob is set at the center click position. When the check is made at a position other than the center click (tracking is off), the pictures will be played back as if the angle is wrong even if it is correct.

Be sure the ACE assembly position adjustment is completed (refer to "Tape Path Adjustment") before making this adjustment.

[Checking Method]

Play back the βII monoscope signal section of the alignment tape (KR5-2H) after setting the tracking control knob at the center click position. Verify that only one monoscope perpendicular line is played back immediately underneath the switching pulse, and not two lines.

If only one perpendicular line can be seen, the angle is correct, and no adjustment is needed.

If there are two, adjust as follows.

[Adjustment Procedure]

1. As shown in Fig. 3-2, screw in the two angle adjustment screws (Jig Ref. No. J-10) so that the lead wires from the video head are on the same level as the red adjusting screw hole and the top of the adjusting screw hole, and the top of the adjusting screw is on the same level as the top of the video head disc.
   (If not screwed in sufficiently, the heads of the adjustment screws hit the upper drum, and the video head disc no longer rotates. Conversely, if they are screwed in too far, the head base moves, and the angle of the video head shifts considerably.)

   Caution: The white lead wire is a reference wire and should never be moved.

2. Screw in either one of the two adjustment screws until it feels tight. Additional tightening beyond this position moves the video head and so the angle can be adjusted.
3. Play back the βII monoscope signal section of the alignment tape (KR5-2H) and verify the angle. If the angle of the perpendicular line is larger than before adjustment, screw the adjustment screw counterclockwise to loosen and adjust the screw on the other side.
4. After adjusting, unscrew and check again.

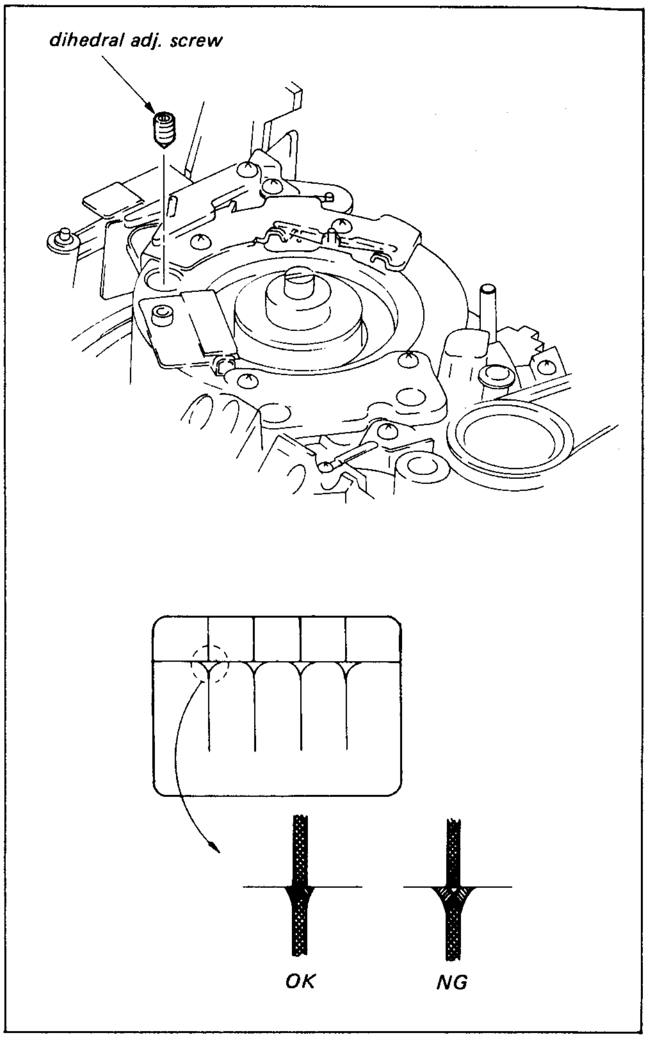


Fig. 3-2. Video head dihedral adjustment

3-3. REPLACEMENT OF DRUM ASSEMBLY

1. Remove the mechanism chassis from the circuit board. (Refer to 1-1-3)
2. Measure and record the two gaps between the upper drum tape holding section and adjust plate (Ⓐ in Fig. 3-3). (Do not forget to do this, as the adjust plate mounting position affects the tape path.)
3. Unscrew the screws ① shown in Fig. 3-3 and remove the tape guide ground plate and adjust plates (1) and (2).
4. Unfasten dew sensor bolt ① shown in Fig. 3-4 and remove the dew sensor.
5. Unscrew screw ② and remove the PTC heater cover, PTC heater and stay from the drum body.
6. Remove the connector, ground terminal, and three drum mounting screws from the rear of the chassis and remove the drum assembly body.
7. Re-assemble the parts in reverse order.
8. Adjust according to "Tape Path Adjustment" after replacing the drum.

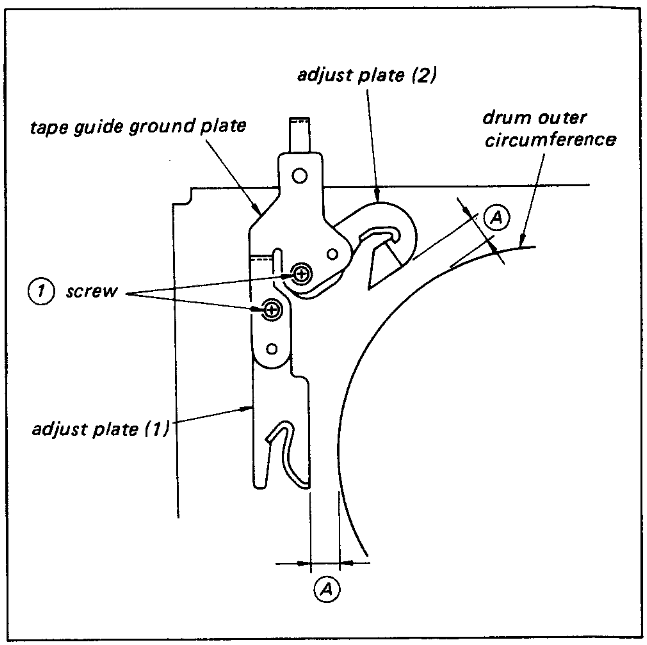

adjust plate (2)
tape guide ground plate
drum outer circumference
Ⓐ
① screw
adjust plate (1)
Ⓐ

Fig. 3-3. Tape guide ground plate

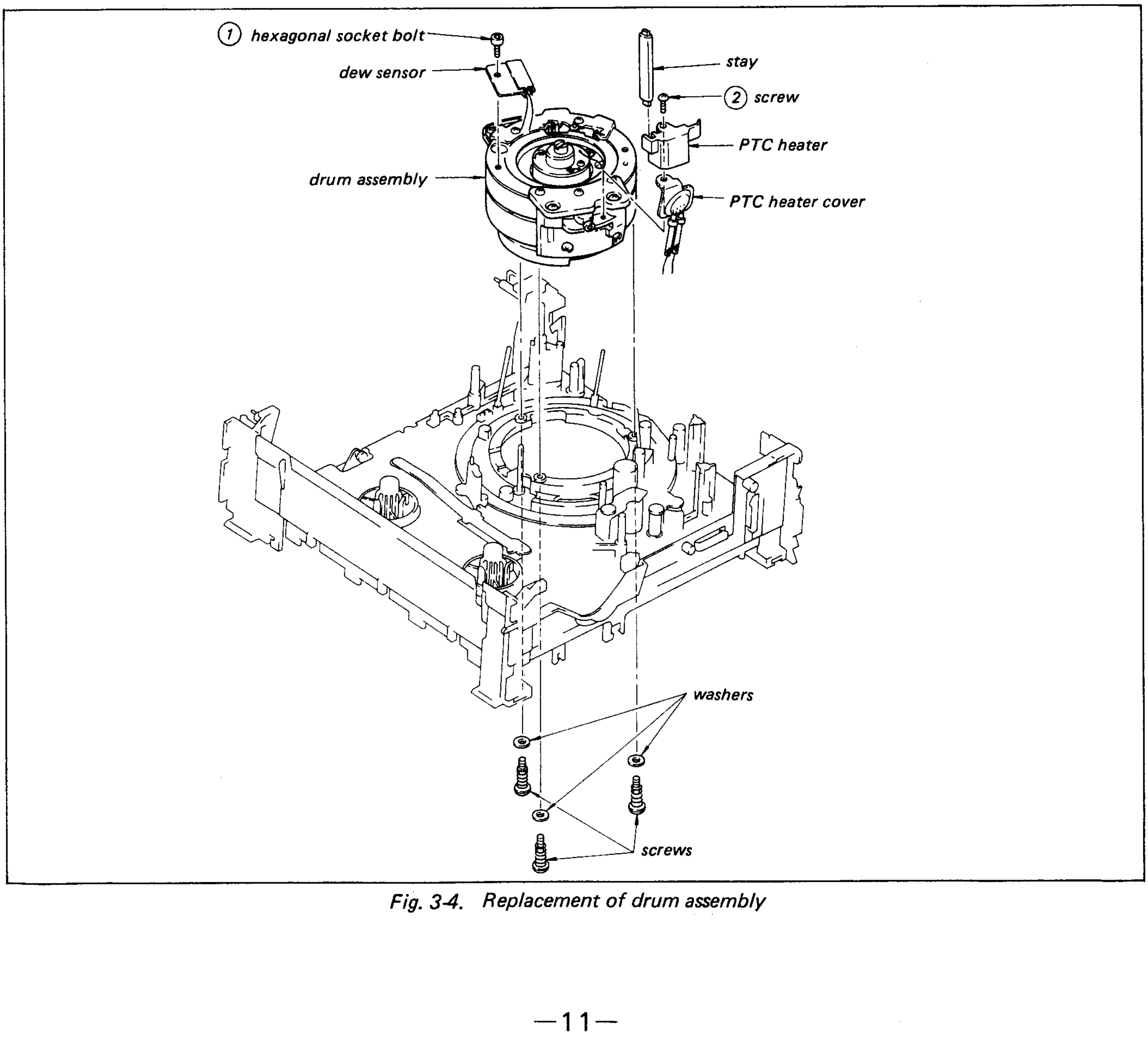

① hexagonal socket bolt
dew sensor
stay
② screw
PTC heater
drum assembly
PTC heater cover
washers
screws

Fig. 3-4. Replacement of drum assembly

3-4. REPLACEMENT OF CAPSTAN DC MOTOR

3-4-1. Removing Capstan Motor (Fig. 3-5)

1) Remove the mechanism chassis from the circuit board. (Refer to 1-1-3)

2) Unscrew screws ①, ②, and ③ and remove the capstan motor from the rear of the mechanism chassis.

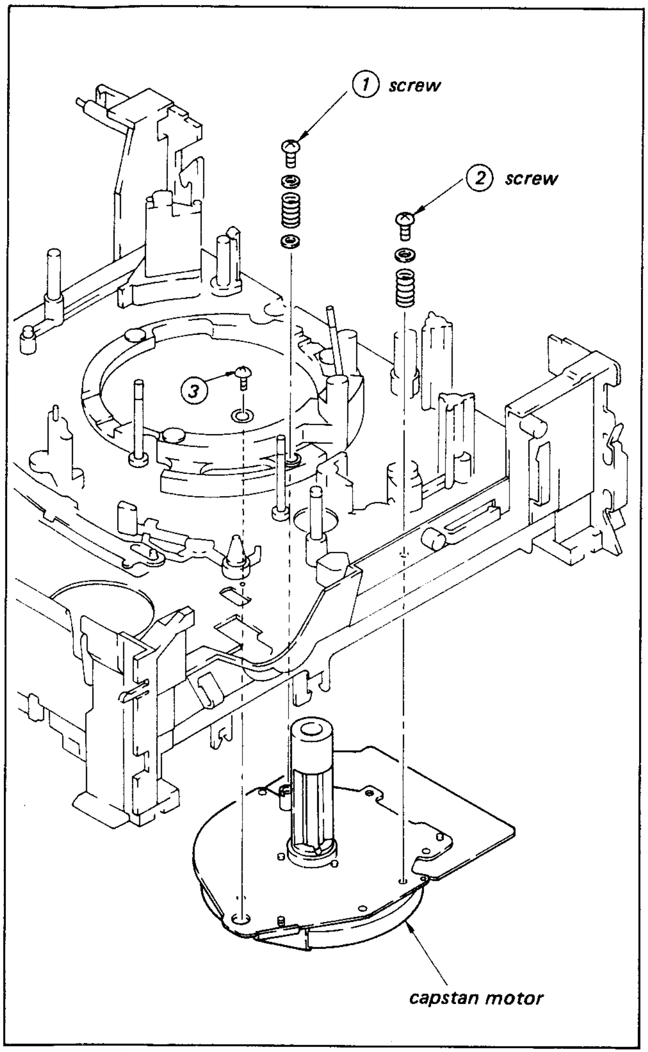

① screw
② screw
③
capstan motor

Fig. 3-5. Removal of capstan motor

3-4-2. Perpendicular Adjustment of Capstan Shaft

Be sure to adjust as follows after the capstan motor has been replaced or removed:

1) Place parallel plate (Tool Ref. No. J-2) on No. 10 guide sleeve of the pinch crimp arm assembly perpendicularly, as shown in Fig. 3-6.

2) Loosen Screw Ⓑ.

3) Rotate adjusting screw Ⓐ and align the capstan shaft perpendicularly.

4) Tighten screw Ⓑ and fix the capstan motor.

5) Adjust according to "Tape Path Adjustment".

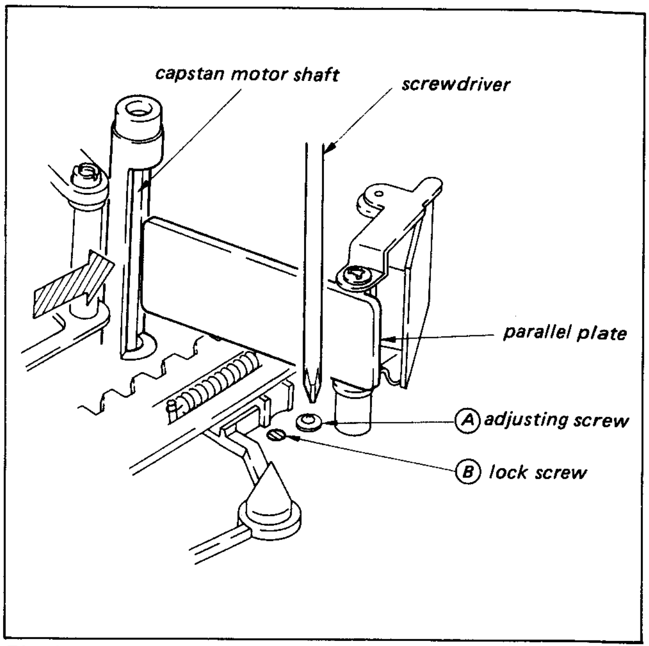

capstan motor shaft
screwdriver
parallel plate
Ⓐ adjusting screw
Ⓑ lock screw

Fig. 3-6. Perpendicular adjustment of capstan motor shaft

3-5. REMOVAL OF TENSION PICKUP ASSEMBLY

(Fig. 3-7)

1. Remove spring ① and disengage hook ② to pull out the tension pickup assembly.
2. Disconnect the wire harness from the wire harness clamp and pull out the connector.

Caution: When replacing or removing the tension pickup assembly, be sure to also adjust the back tension. See "Back Tension Check and Adjustment".

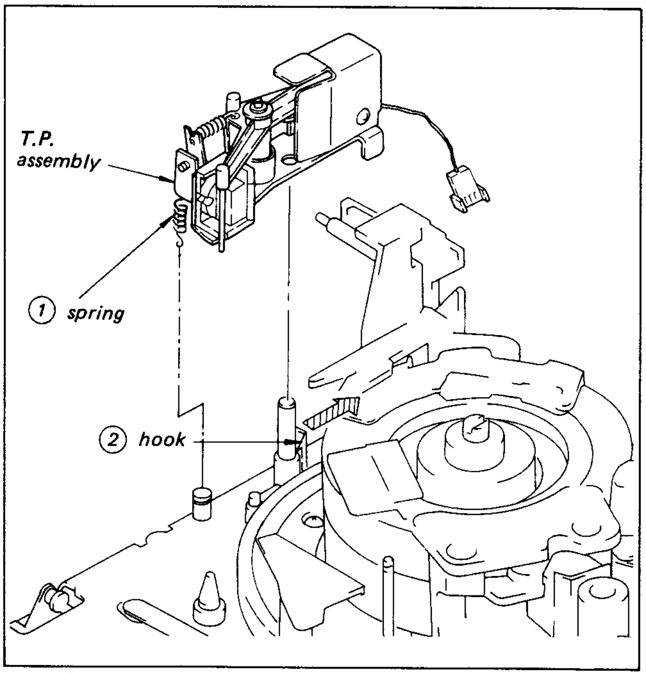

T.P. assembly
① spring
② hook

Fig. 3-7. Removal of tension pickup assembly

3-6. REMOVAL OF CASSETTE COMPARTMENT

(Fig. 3-8)

1. Unthread and lift up the cassette compartment.
2. Unscrew four screws ① and remove the cassette compartment by lifting it up.

Caution: When removing the cassette compartment be careful not to hook it on the tension pickup.

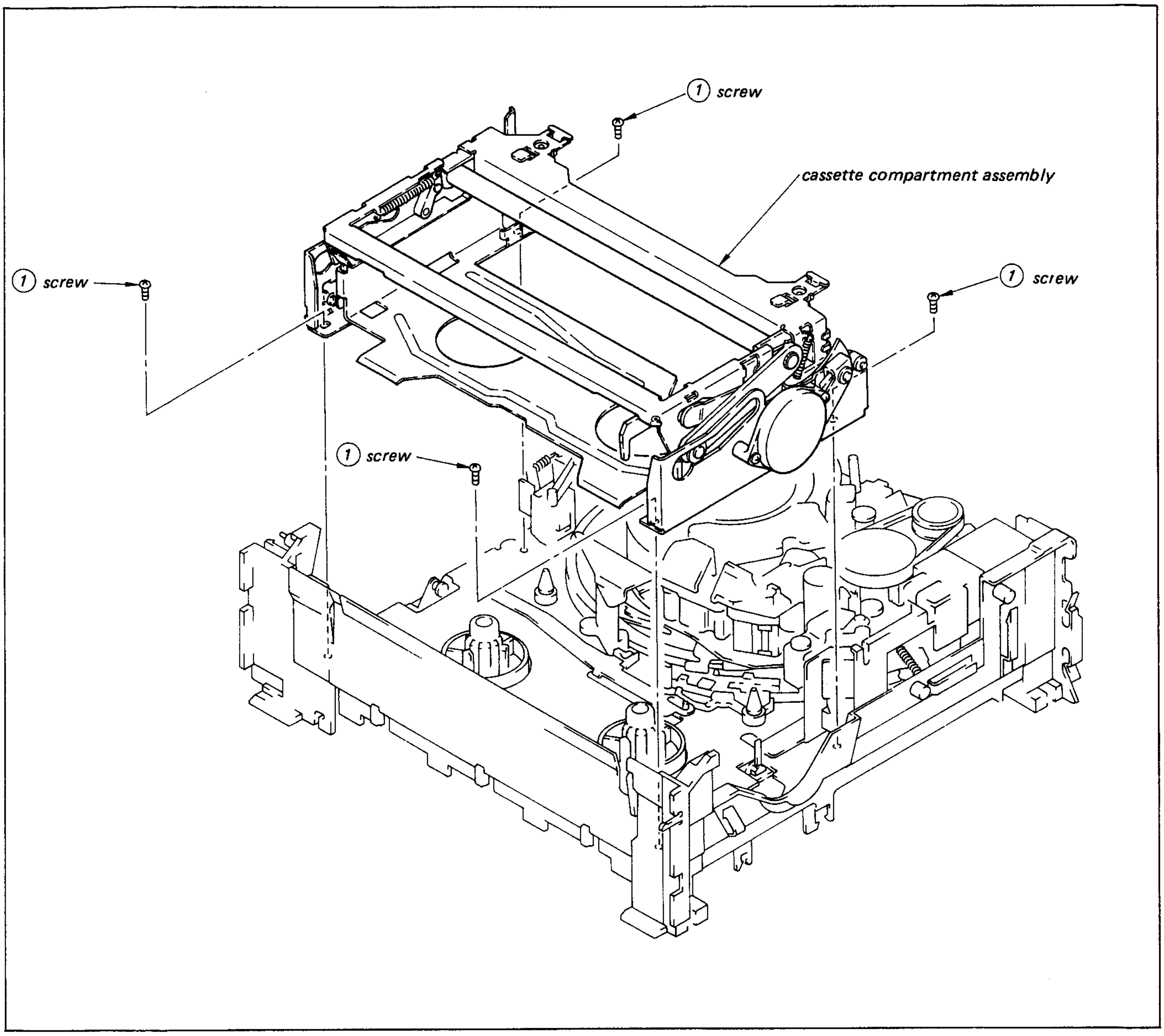

① screw
cassette compartment assembly
① screw
① screw
① screw

Fig. 3-8. Removal of cassette compartment assembly

3-7. REMOVAL OF REEL MOTOR (Fig. 3-9)

1. Remove the mechanism chassis from the circuit board. (Refer to Paragraph 1-1-3)
2. Unscrew the five mounting screws ① on the rear of the chassis and remove the reel motor body.

   Note: The rotor section can be removed by pulling it straight up.

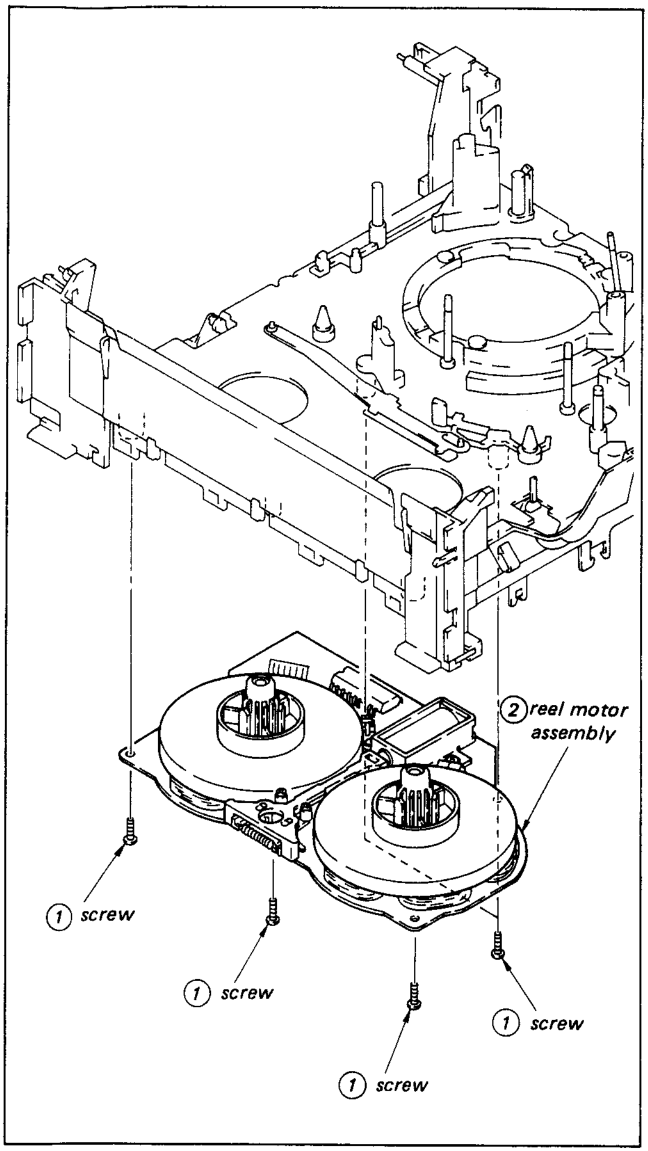


Fig. 3-9. Removal of reel motor

3-8. THREADING/UNTHREADING ADJUSTMENT

3-8-1. Checking Cassette Detection Switch Operation

1) Unthread manually without loading a cassette.
2) Check that the cassette detection switch in Fig. 3-10 does not trip (no click is generated) when pushed.
3) Press the cassette compartment lock in the diagram with blade-tip screwdriver to lock it.
4) Check that the cassette detection switch trips when pushed (click sound).
5) Push the release slide plate of the cassette compartment lock in the direction of arrow Ⓐ and push the lock lever assembly in the same direction to return it to the previous state.

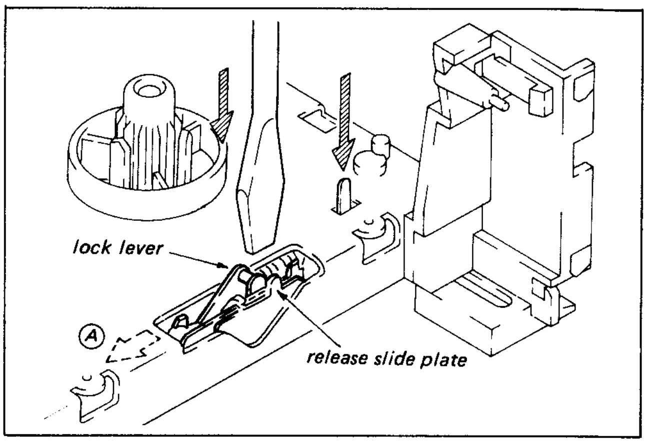


Fig. 3-10.

3-8-2. Unthreading Check

1) Set in STOP mode without loading a cassette.
2) Press the EJECT button and unthread. (Unthreading is complete when the T slider shaft returns slightly in the threading direction and stops after pushing the cassette-compartment lock release lever.)
3) Check that the actuator for the unthreading end switch is not tripped as shown in Fig. 3-11. (Slowly rotate the threading motor by hand and verify with a click sound.)
   Adjust according to Paragraph 3-13-2 if needed.

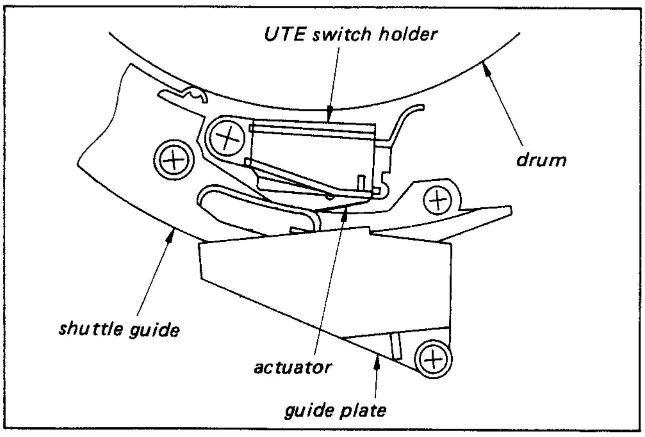


Fig. 3-11. Unthreading end switch

3-9. S-THREADING RING REPLACEMENT AND ADJUSTMENT

3-9-1. Removal of S-Threading Ring

Remove ACE head Assembly, FE Head, and Unthreading Motor (Fig. 3-12)

1) Unscrew the screw①.

2) Remove the No. 6 guide nut②, flange③, spacer④, and compression coil spring⑤.

3) Remove the two guide adjusting nuts ⑥ and remove the ACE head assembly and FE head.

Caution: ACE assembly and FE head are connected by a lead. Be careful when removing them. The compression coil spring underneath the ACE assembly does not have to be removed. However, be careful not to lose it.

4) Unscrew the two screws⑦ and pull up the threading motor assembly to remove.

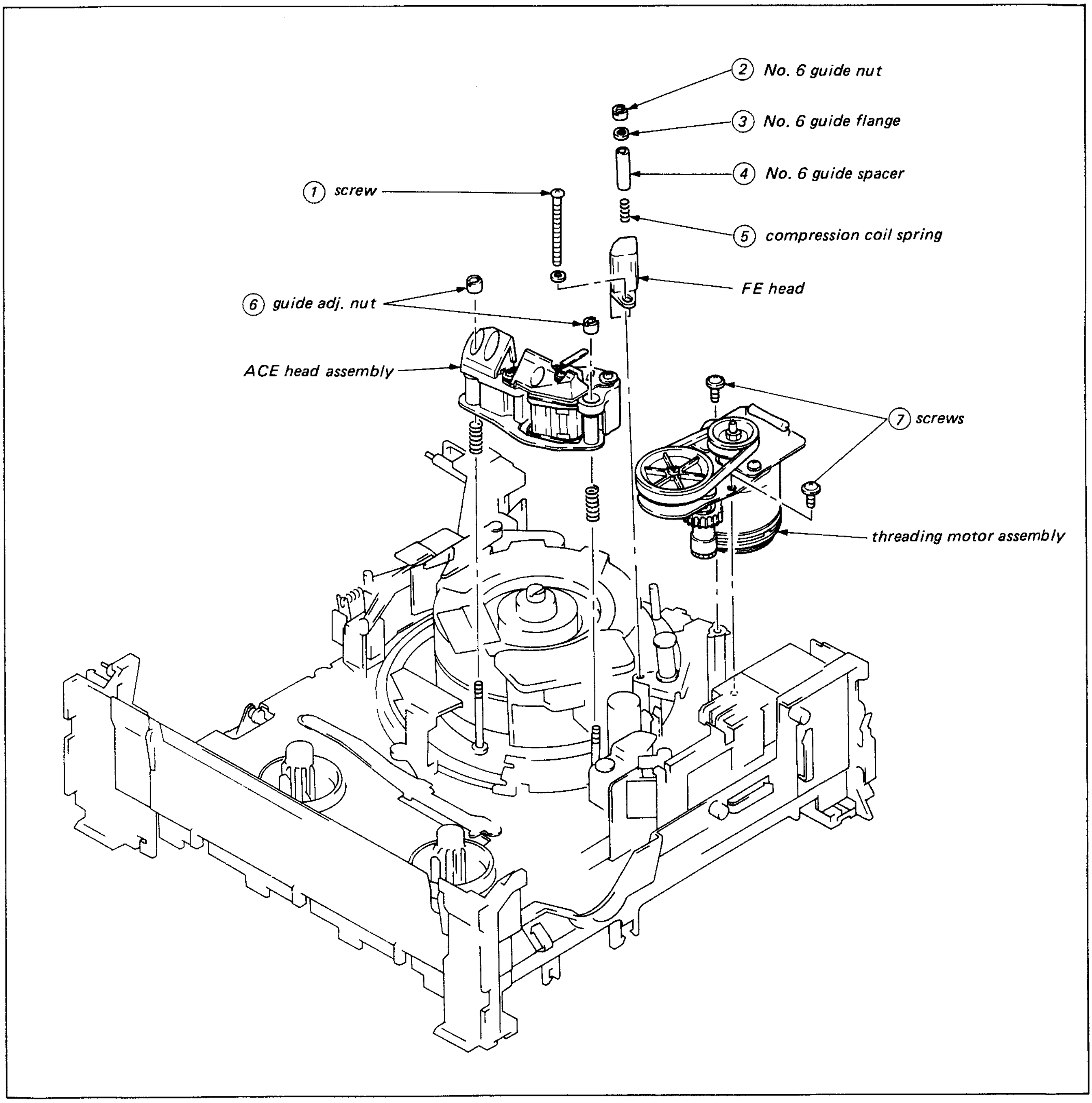

② No. 6 guide nut
③ No. 6 guide flange
④ No. 6 guide spacer
① screw
⑤ compression coil spring
FE head
⑥ guide adj. nut
ACE head assembly
⑦ screws
threading motor assembly

Fig. 3-12. Removal of ACE head assembly, FE head and threading motor

Removal of Other Parts (Fig. 3-13)

1) Measure the gap between the upper drum and adjust the plate as for replacement of the drum assembly. (Fig. 3-3)

2) Unscrew the screws ① and remove the tape guide ground plate ② and adjust plate ③.

3) Unscrew the two screws ④ and remove the holder assembly ⑤.

4) Unscrew screw ⑥ and remove the guide plate ⑦.

5) Unscrew the two screws ⑧ and five screws ⑨ to remove the shuttle guide I ⑩ and II ⑪, as well as the slant base assembly ⑫.

6) Unscrew screw ⑬ and remove the pin recliner ⑭.

Caution: When the guide plate is removed, do not thread or unthread with the shuttle guide mounted.

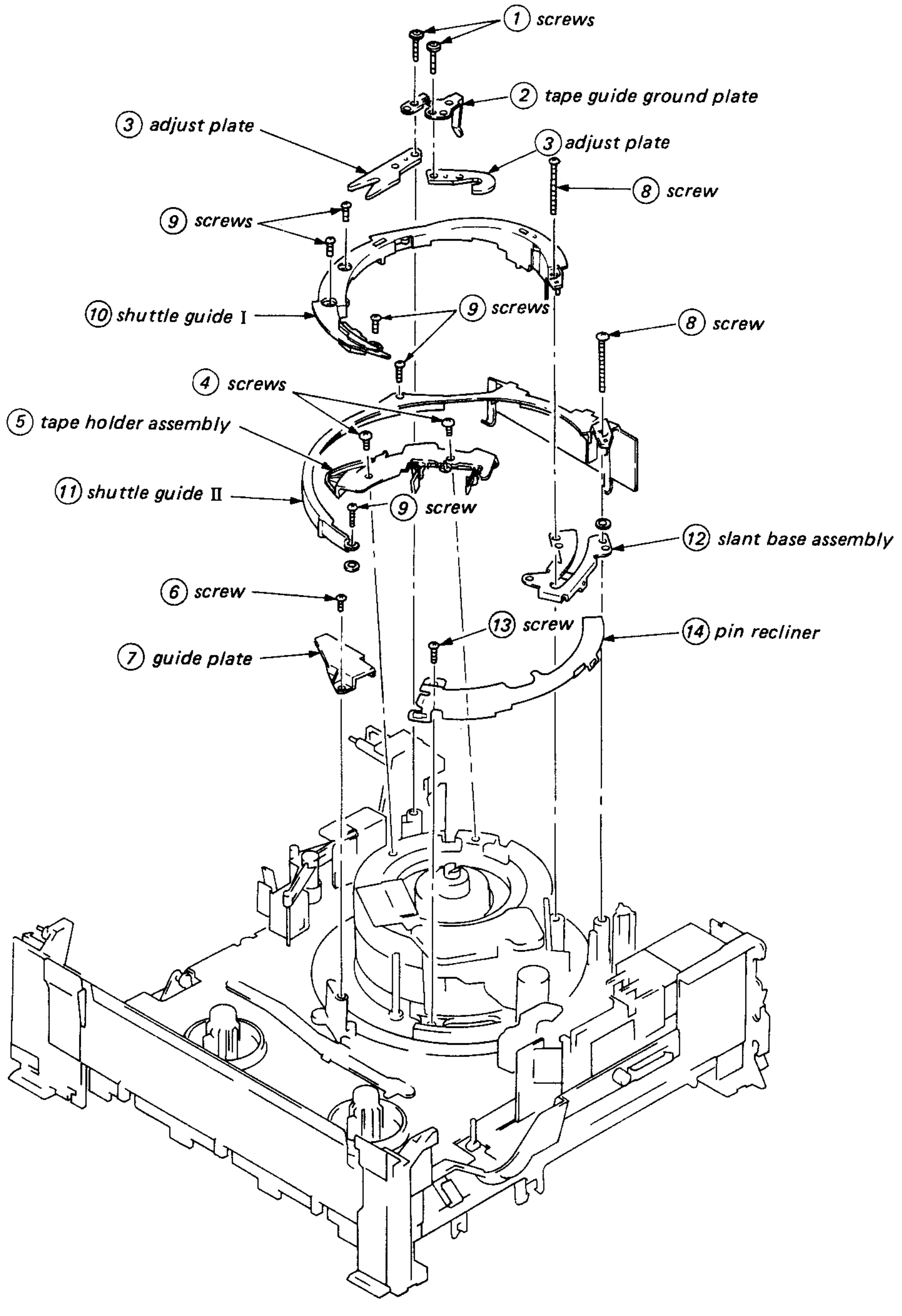

① screws
② tape guide ground plate
③ adjust plate
③ adjust plate
⑧ screw
⑨ screws
⑩ shuttle guide I
⑨ screws
⑧ screw
④ screws
⑤ tape holder assembly
⑪ shuttle guide II
⑨ screw
⑫ slant base assembly
⑥ screw
⑬ screw
⑭ pin recliner
⑦ guide plate

Fig. 3-13.

3-9-2. Removal of S-Threading Ring Assembly
(Fig. 3-14)

1) Make sure that the drum assembly has been removed according to Paragraph 3-3.

2) Remove the spring of the lock arm assembly. (Refer to Paragraph 3-13-1, Fig. 3-21)

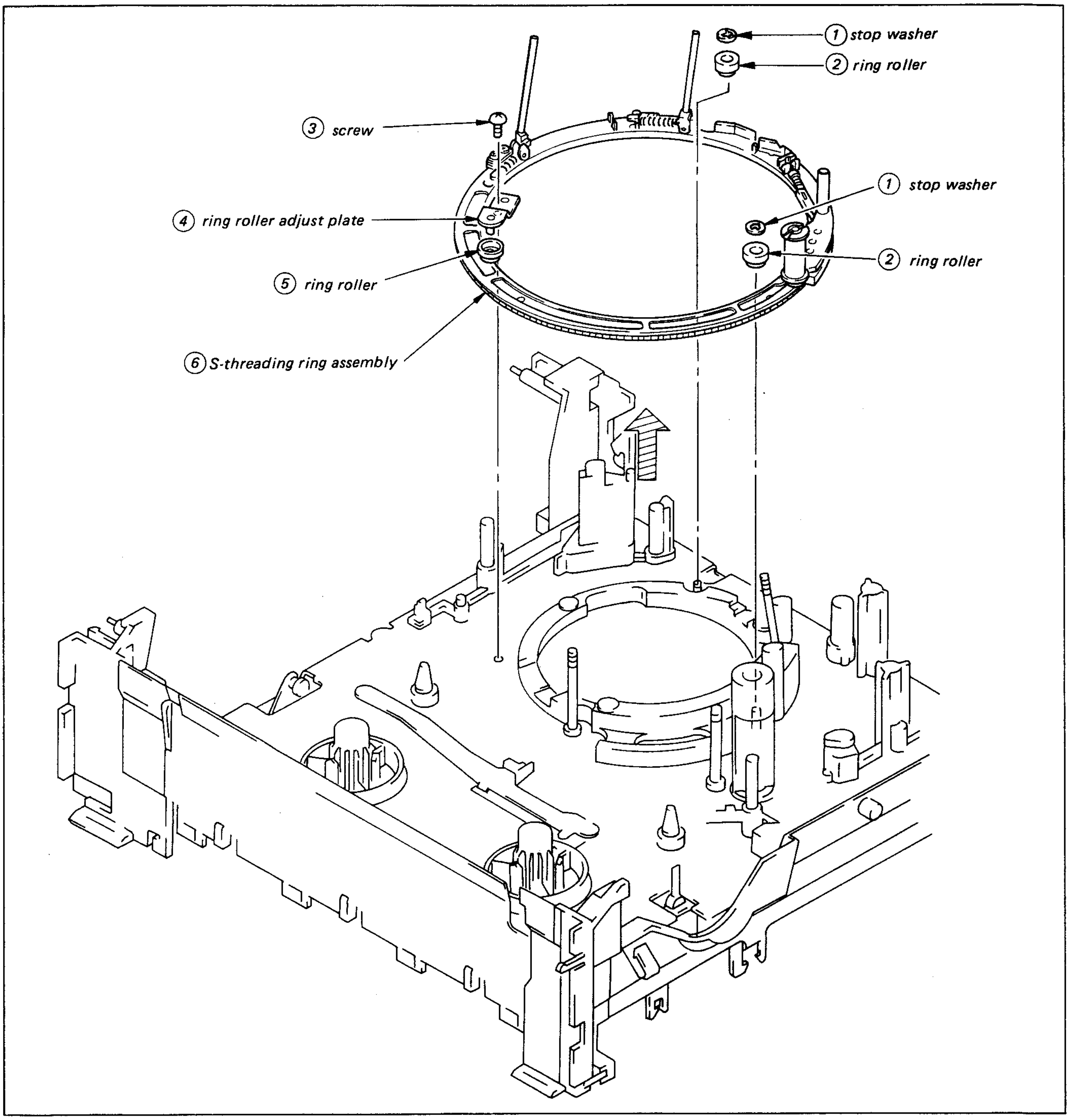
3) Remove stop washer ① and ring roller ②.

4) Remove the UTE switch subassembly. (Refer to Paragraph 3-13-2, Fig. 3-25)

5) Unscrew screw ③ and remove the ring roller adjust plate ④ and ring roller ⑤.

6) Remove the S-threading ring assembly ⑥.

Caution: Do not use the same washer twice.



① stop washer
② ring roller
③ screw
① stop washer
④ ring roller adjust plate
⑤ ring roller
② ring roller
⑥ S-threading ring assembly

Fig. 3-14. Removal of S-threading ring assembly

3-9-3. Checking Slider Stopper Mounting (Fig. 3-15)

1) Check that the drive gear is engaged.
2) Loosen screw①, insert a spacer (t = 0.2) between the slider gear and slider stopper, then tighten screw ① while pushing in the directions of arrows Ⓐ and Ⓑ.

Caution: Make sure to push it in the direction Ⓐ to eliminate any backlash. The slider stopper rotates in the direction of arrow Ⓐ when screw ① is tightened. Therefore, tighten the screw while holding it with blade-tip screwdriver.

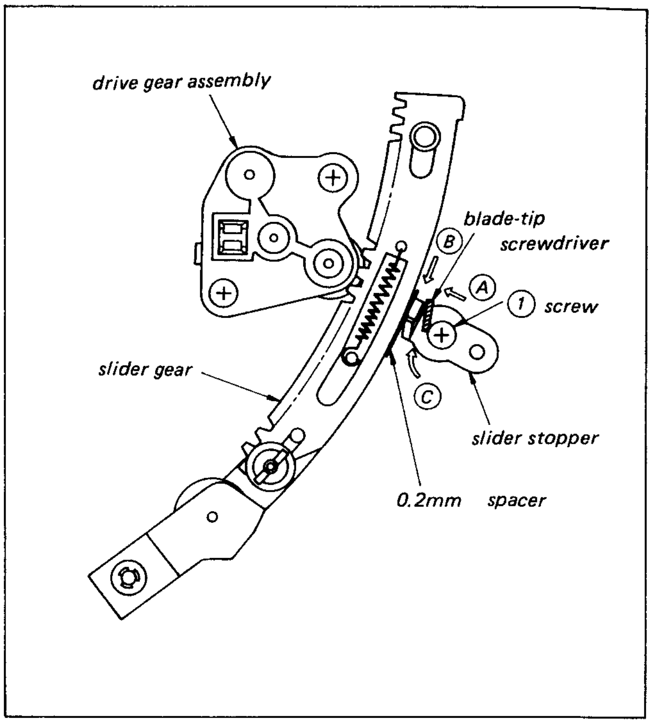

drive gear assembly
blade-tip screwdriver
Ⓑ
Ⓐ
① screw
slider gear
Ⓒ
slider stopper
0.2mm spacer

Fig. 3-15. Checking slider stopper mounting

3-9-4. Replacement of S-Threading Ring (Fig. 3-16)

1) Mount the S-threading ring.
2) Insert a spacer (t = 0.2) and set the slider to the position where unthreading is complete.
(In the diagram, the slider stopper and slider gear come into contact at Ⓐ through the spacer.)
3) Match up the notch on the S-threading ring and the tab on the drive gear as shown at Ⓑ in the diagram.
4) Engage the drive gear, S-threading ring, and slider gear, and position the chassis.
5) The gap between the tab on the slider gear and the slider stopper at section Ⓐ is about 0.5 mm when the S-threading ring is rotated fully in the direction of arrow ⓐ. At the same time, verify that the chassis hole (ϕ3) at Ⓒ and the hole (ϕ0.15) of the S-threading ring match.
6) Engage the drive gear and the S-threading gear.

Caution: After changing and mounting, adjust the guide height according to Section 3-10. Also adjust the ACE assembly in accordance with the section on "Tape Path Adjustment".

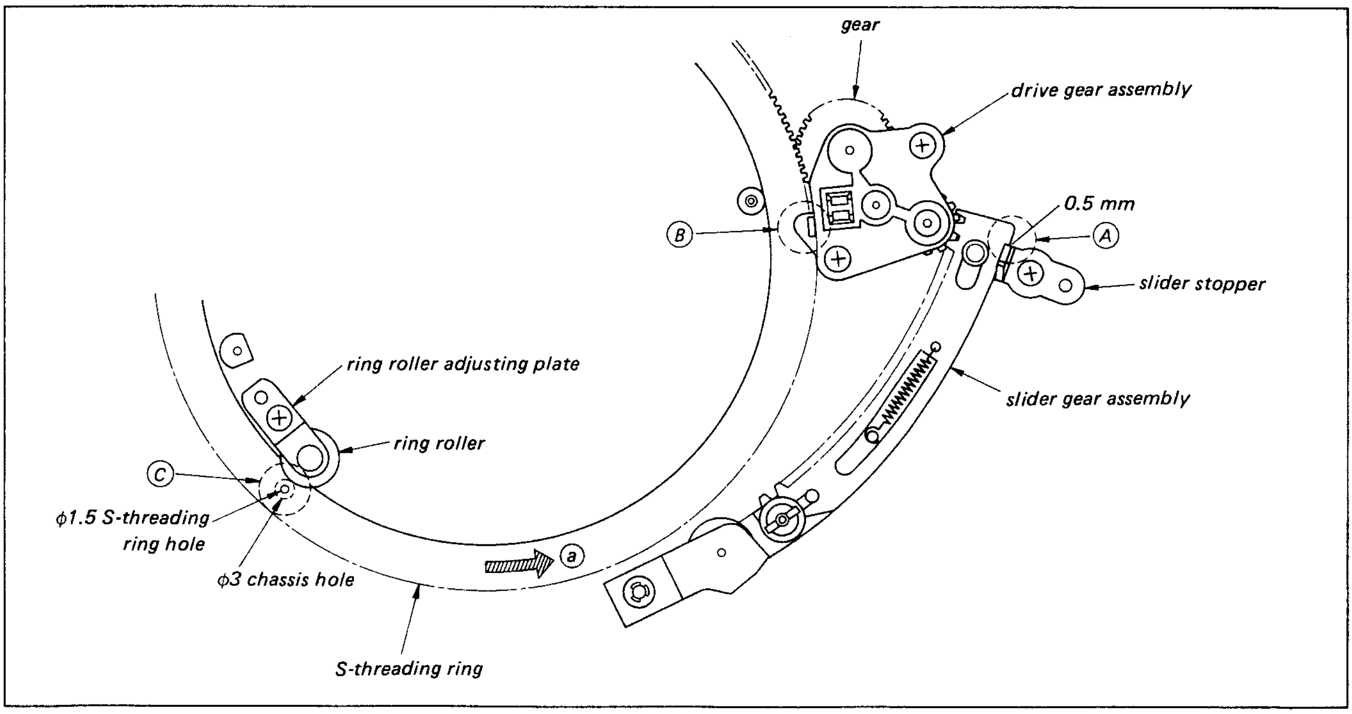
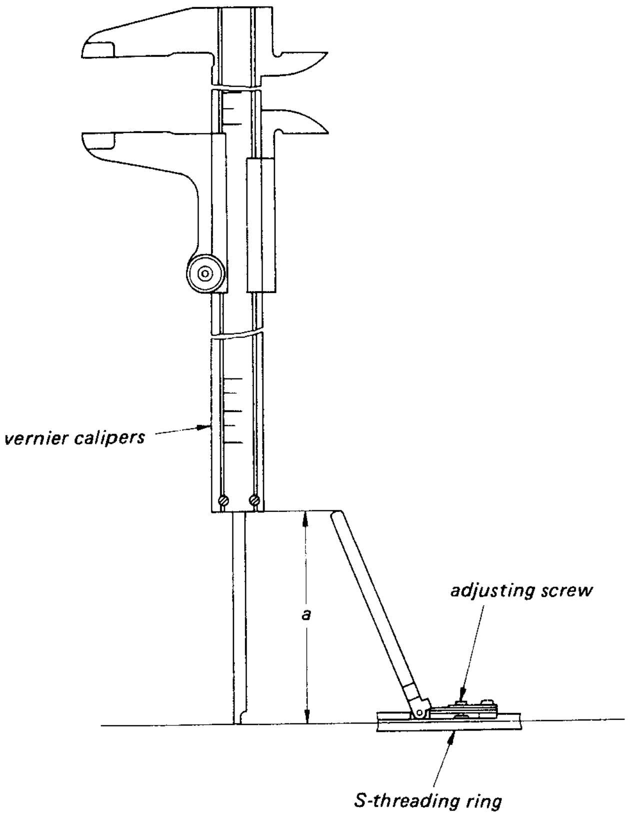

gear
drive gear assembly
0.5 mm
Ⓐ
slider stopper
Ⓑ
slider gear assembly
ring roller adjusting plate
ring roller
Ⓒ
ϕ1.5 S-threading ring hole
ϕ3 chassis hole
ⓐ
S-threading ring

Fig. 3-16. Replacement of S-threading ring

3-10. ADJUSTMENT OF NO. 2 AND 3 GUIDE HEIGHTS (Fig. 3-17)

1. Rotate the threading motor by hand until the No. 2 guide comes up completely.
2. Adjust the height between the upper face of the S-threading ring and guide tip as shown in the diagram, so as to attain the values indicated in the table when the guide is pushed down by hand and comes up again. Adjust with the height adjusting screw.
3. Adjust the No. 3 guide in the same manner.


vernier calipers
a
adjusting screw
S-threading ring

Guide No.	Standard Value (a)
2	33.5 mm
3	28.5 mm

Fig. 3-17. Height adjustment, Nos. 2 and 3 guides

3-11. CHECKING AND ADJUSTMENT OF PINCH CLOSING LIMITER CLEARANCE (CHECKING PROCEDURE)

1. Set in the STOP mode without loading a cassette.
2. Check that the clearance ‘t’ of the pinch closing limiter (Fig. 3-18) is 0.2 to 0.7 mm. If it is not, adjust as follows:

[Adjustment Procedure]

1) Loosen screw Ⓐ in Fig. 3-18 with the pinch solenoid held in.
2) Move the pinch limiter adjust plate (shaded in the diagram) fully in the direction of arrow ⓐ. The clearance ‘t’ in this state is 0.
3) Push the pinch limiter adjust plate in the direction of arrow ⓑ as shown at section Ⓑ using a blade-tip screwdriver, until the clearance ‘t’ is 0.2 to 0.7 mm.
4) Tighten screw Ⓐ and lock it.

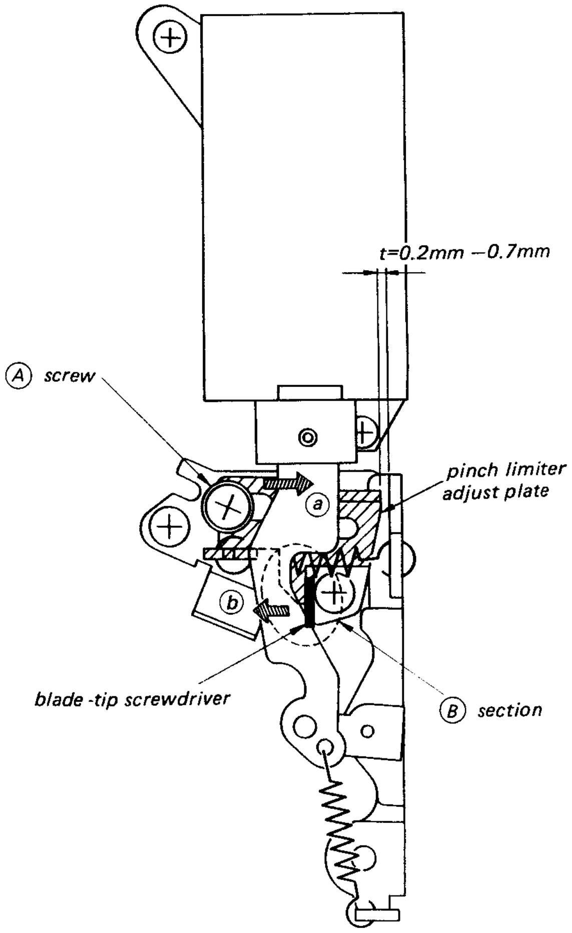

t=0.2mm –0.7mm
Ⓐ screw
ⓐ
ⓑ
pinch limiter adjust plate
blade-tip screwdriver
Ⓑ section

Fig. 3-18 Adjusting clearance of pinch crimp limiter

3-12. BRAKE OPERATION CHECK AND BRAKE PLUNGER ADJUSTMENT

The tape slackens particularly when the tape diameter on the take-up side in both FF and REW is small.

[Checking Procedure]

1) Start winding a cassette. (Rewind the tape and start forward feed)
2) Repeat FF→STOP several times and check that the tape does not slacken. If the tape slackens, adjust as follows.
3) Wind the tape to the end in forward feed.
4) Repeat REW→STOP several times and verify that the tape does not slacken. Adjust as follows if the tape slackens.

[Adjustment Procedure]

1) Remove the mechanism chassis from the circuit board.
2) Loosen screw Ⓐ on the plunger solenoid (Fig. 3-19).
3) Push the plunger in the direction of arrow Ⓑ by hand until fully retracted.
4) Adjust the plunger solenoid so as to obtain clearances of 0.2 to 0.7 mm between the two brakes and S and T reel rotors. Tighten screw Ⓐ.

Note: After tightening screw Ⓐ, check for proper clearance at Ⓒ and Ⓓ.

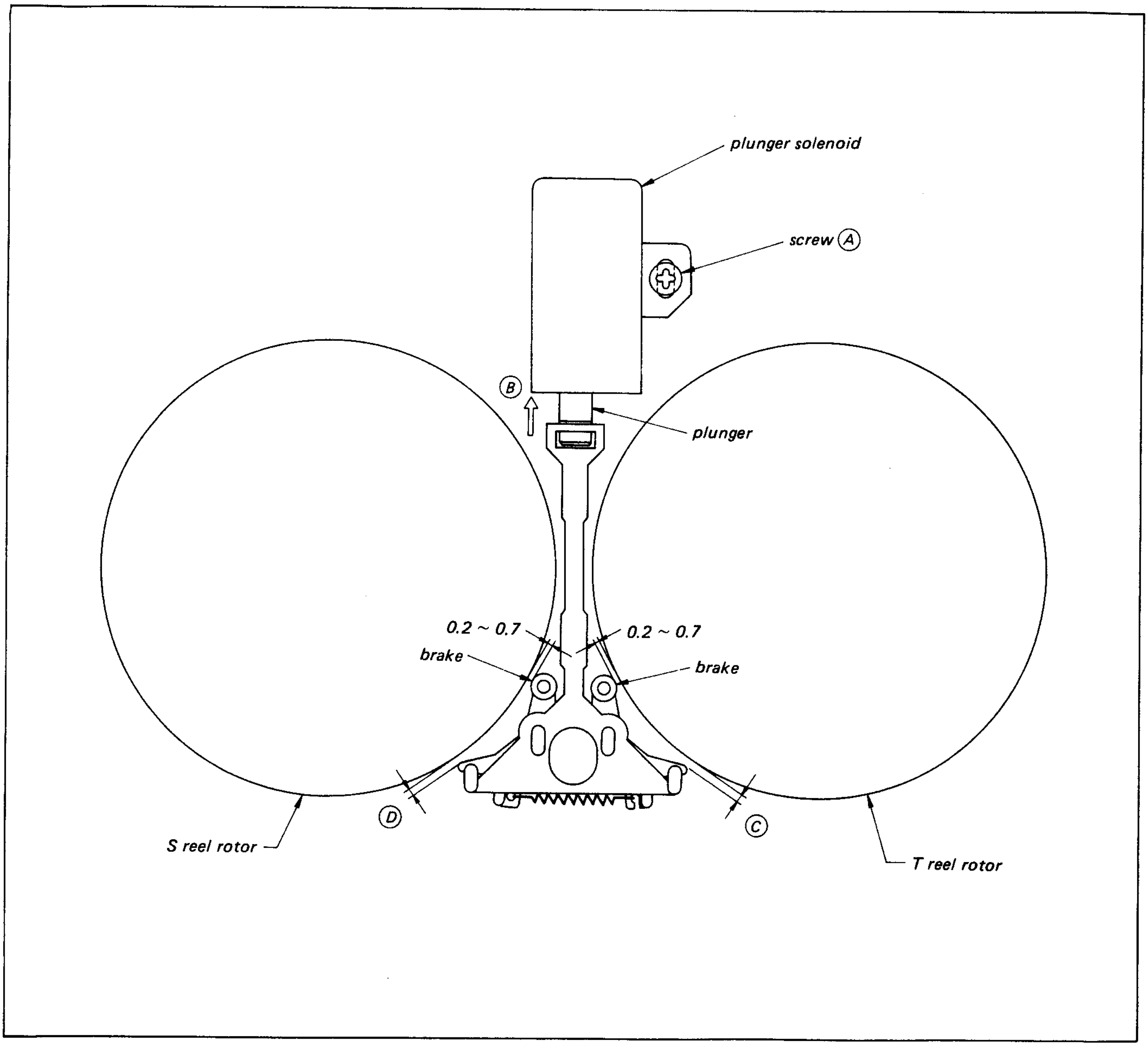


Fig. 3-19. Brake plunger adjustment

3-13. CHECKING AND ADJUSTMENT OF MICROSWITCH POSITION

3-13-1. Checking and Adjustment of Threading End Switch (TE Switch) Position

[Checking Procedure] (Fig. 3-20)

Rotate the S-threading ring by hand and check that the TE switch turns on and off with a clicking noise while the lock roller is moving within the lower 2/3 of the straight portion ℓ of the recess (Ⓐ in Fig. 3-20) on the ring

If not, adjust as follows.

[Adjustment Procedure]

1) Bring the lock roller into the lower 2/3 of the 'ℓ' range in the recess on the S-threading ring, move the TE switch in the direction of the arrow using a blade-tip screwdriver, until the switch trips (click noise), then tighten screw Ⓑ.
2) Check the results of the adjustment following the check procedure given above.

[Removal]

1) Unhook the tension coil spring from the lock arm assembly.
2) Unscrew screw ① and remove the TE switch subassembly.
3) Push the hook on the main chassis assembly in the direction of the arrow to unhook, and remove the lock arm assembly.

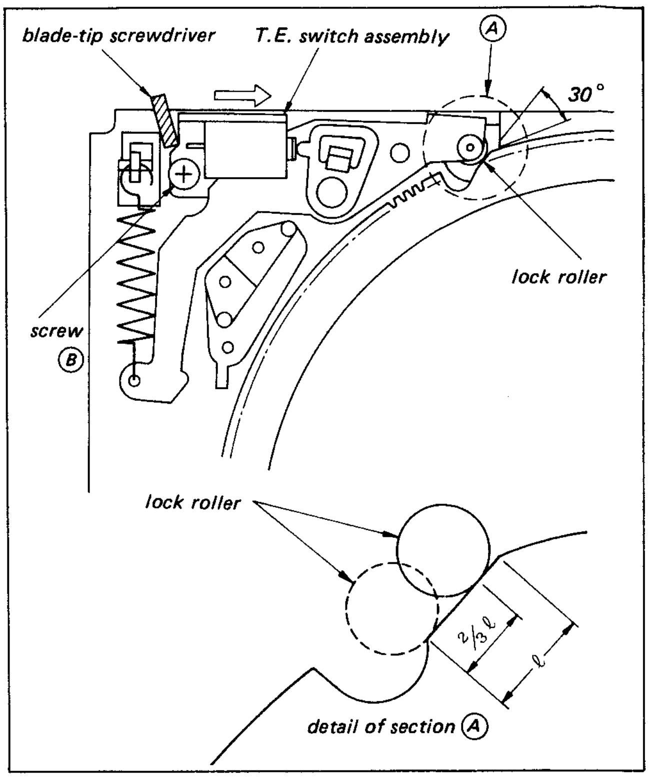

blade-tip screwdriver
T.E. switch assembly
Ⓐ
30°
lock roller
screw
Ⓑ
lock roller
2/3ℓ
ℓ
detail of section Ⓐ

Fig. 3-20. TE switch position adjustment

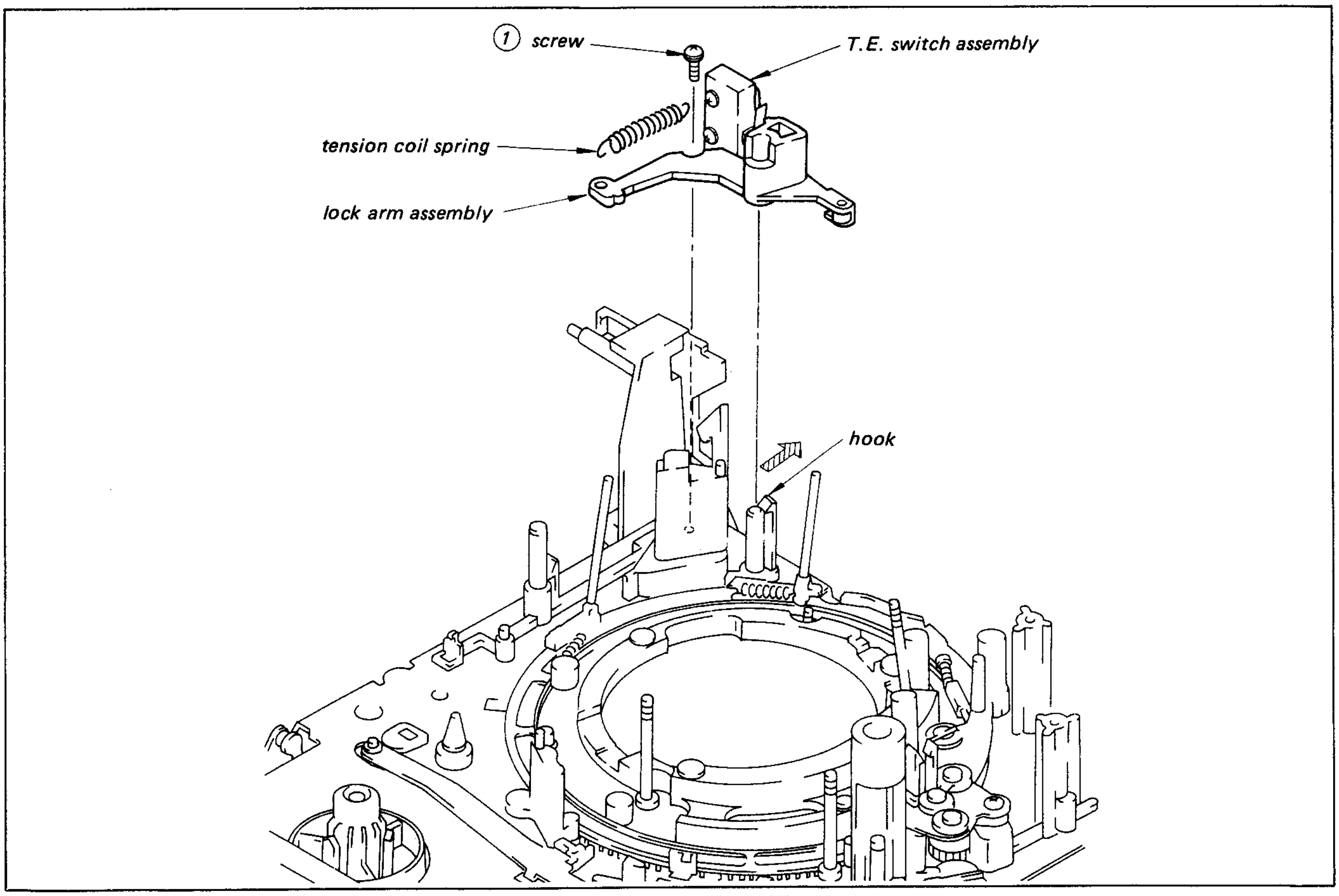

① screw
T.E. switch assembly
tension coil spring
lock arm assembly
hook

Fig. 3-21. Removal of TE switch

3-13-2. Checking and Adjustment of Unthreading End Switch (UTE Switch) Position

[Checking Method]

Rotate the S-threading ring by hand. Verify that the switch trips when a pin of $\phi1.5$ is inserted at Section Ⓐ in Fig. 3-22 after the UTE switch arm roller assembly has dropped into the UTE switch cam groove. Verify that the switch does not trip when a pin of $\phi0.6$ is inserted.

[Adjustment Method]

1) If the switch does not trip after inserting a $\phi1.5$ pin, loosen small screw Ⓑ and adjust by moving in the direction of the arrow little by little.

2) Bend the switch actuator as shown in Fig. 3-23 if the switch turns on when a $\phi0.6$ pin is inserted.

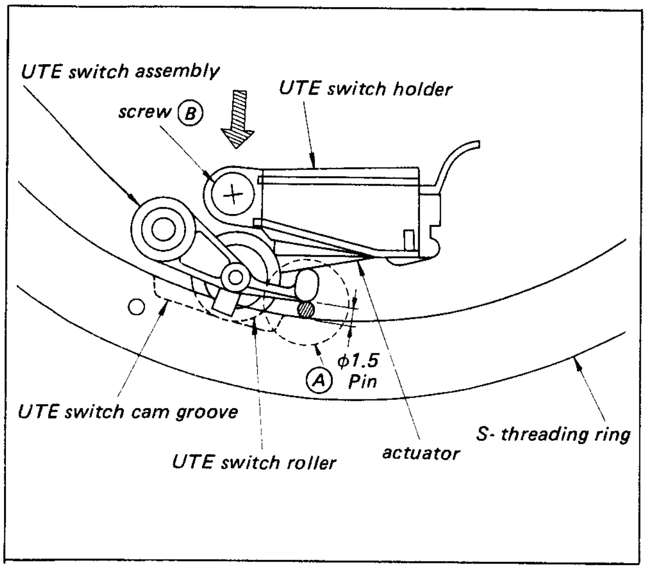

UTE switch assembly
screw Ⓑ
UTE switch holder
$\phi1.5$
Ⓐ Pin
UTE switch cam groove
S- threading ring
UTE switch roller
actuator

Fig. 3-22. U. T. E switch position adjustment

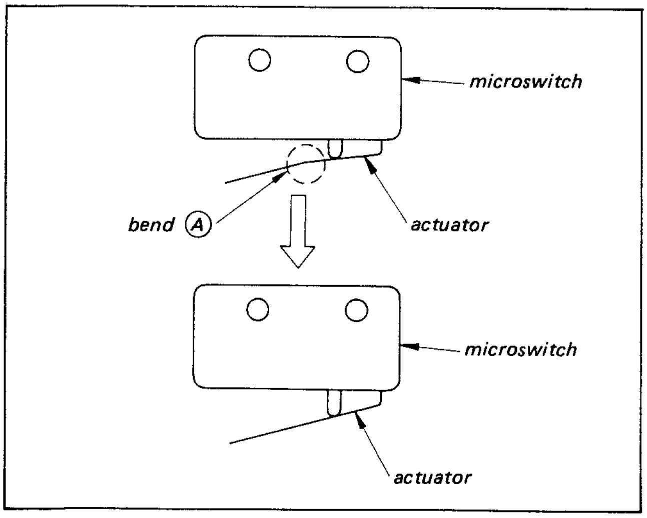

microswitch
bend Ⓐ
actuator
microswitch
actuator

Fig. 3-23.

Caution: Insert the $\phi1.5$ and 0.6 pins in the positions shown in Fig. 3-22. (If the pins are inserted too close to the UTE roller side as shown in Fig. 3-24, the clearance inside will be less than 1.5 mm, even though it is 1.5 mm at the entrance, because of the switch construction.

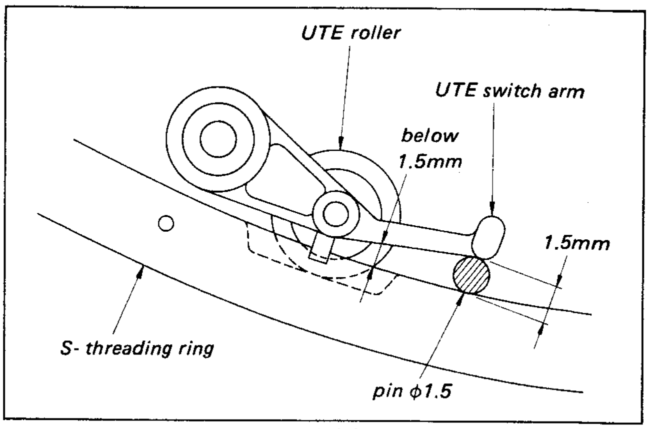

UTE roller
UTE switch arm
below 1.5mm
1.5mm
S- threading ring
pin $\phi1.5$

Fig. 3-24.

[Removal]

1) Unscrew screw ① as shown in Fig. 3-25.

2) Release the switch hook from the chassis and remove the switch body while pushing the actuator to the "ON" position.

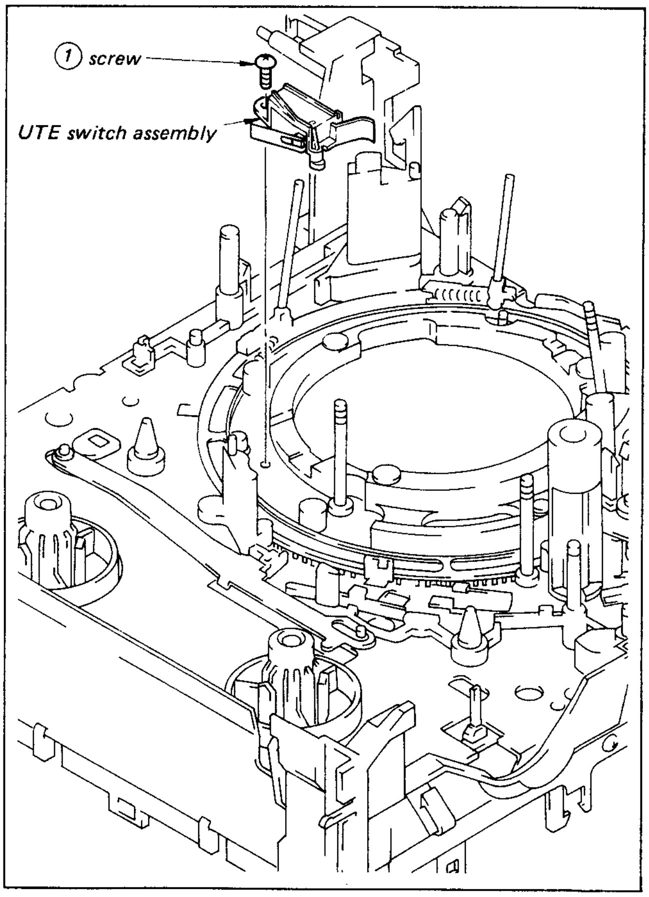

① screw
UTE switch assembly

Fig. 3-25. Removal of UTE switch

3-14. FORWARD/BACK TENSION MEASUREMENT

The forward/back tension measurement for SL-F1E performed using a torque cassette (SL-0003C).

3-14-1. Measurement Procedure

1) Remove the top panel so that the tape path is visible.
2) Insert the torque cassette and put the set into replay mode.
3) Read the indicated value of the S-reel side meter after the pointer has made one revolution.

Specified Value 45 ~ 48 g·cm

Notes: i) The set must be level when the measurement is performed.
ii) After measuring, the tape may go slack if the stop button is pushed. In this case, put the set into forward mode to take up the slack before removing the tape.

3-14-2. Adjustment Procedure

If the specified value is not obtained, adjust by turning RV-202 on the MA-3 board.

SECTION 4
TAPE PATH ADJUSTMENT

4-1. TRACKING ADJUSTMENT

This adjustment has significant effect on picture quality in each mode and tape interchangeability, so please perform it very carefully.

4-1-1. Preparation

1) Remove the cassette cover of alignment tape KR5-2H as shown in Fig. 4-1.

2) Clean the tape contact surfaces (tape guides, drum, capstan spindle, pinch roller, ACE•FE head surfaces) with chamois dampened with methanol.

3) Oscilloscope connection: CN3-3 pin (SF-5 board)

4) Replay the tracking portion of the KR5-2H alignment tape:

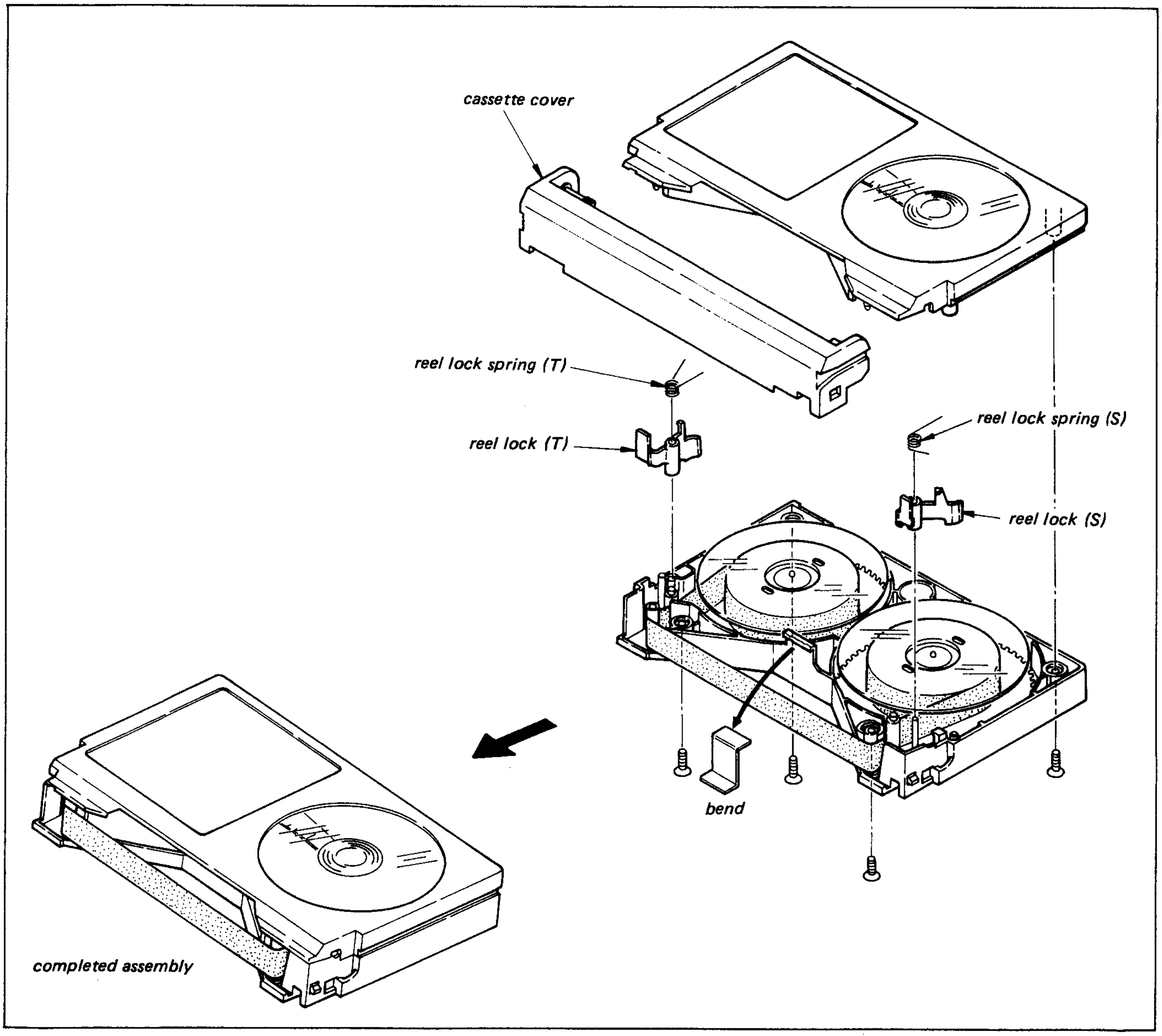

cassette cover
reel lock spring (T)
reel lock (T)
reel lock spring (S)
reel lock (S)
bend
completed assembly

Fig. 4-1.

5) Confirm that the RF output waveform is flat, with maximum amplitude. (The waveform should increase and decrease, remaining flat, when the tracking control knob is turned back and forth.) Also, when the waveform is maximum, confirm that the RF output waveform variation and contact satisfy the specifications shown in Fig. 4-2. If they do not meet the specifications, follow the instructions in 6).

6) If the tracking control knob is turned and the entrance waveform does not flatten as shown in Fig. 4-3(a), perform the entrance side adjustment in 4-1-2. If the exit waveform does not flatten as shown in Fig. 4-3(b), perform the exit side adjustment in 4-1-3.

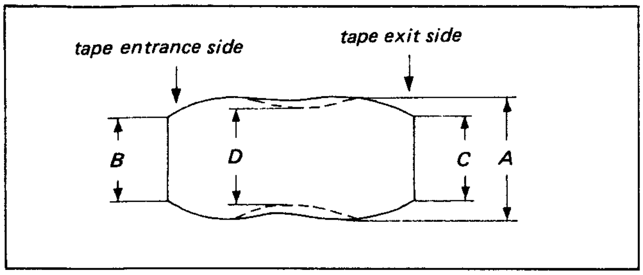

tape entrance side
tape exit side
B
D
C
A

Fig. 4-2.

Specifications: Tracking Control Knob at Maximum

Contact: $\frac{B}{A} \geqq 0.7$

$\frac{C}{A} \geqq 0.7$

Variation: $\frac{D}{A} \geqq 0.9$

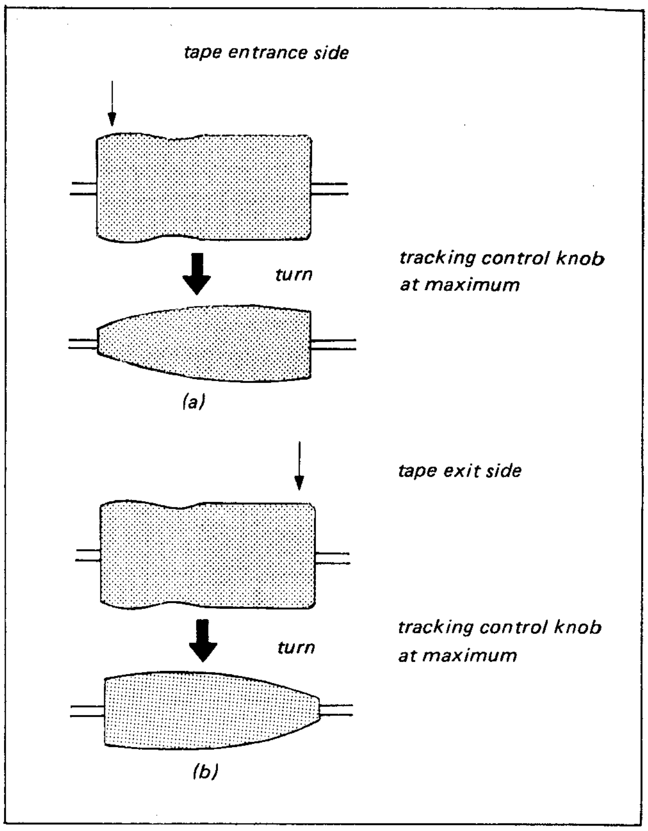
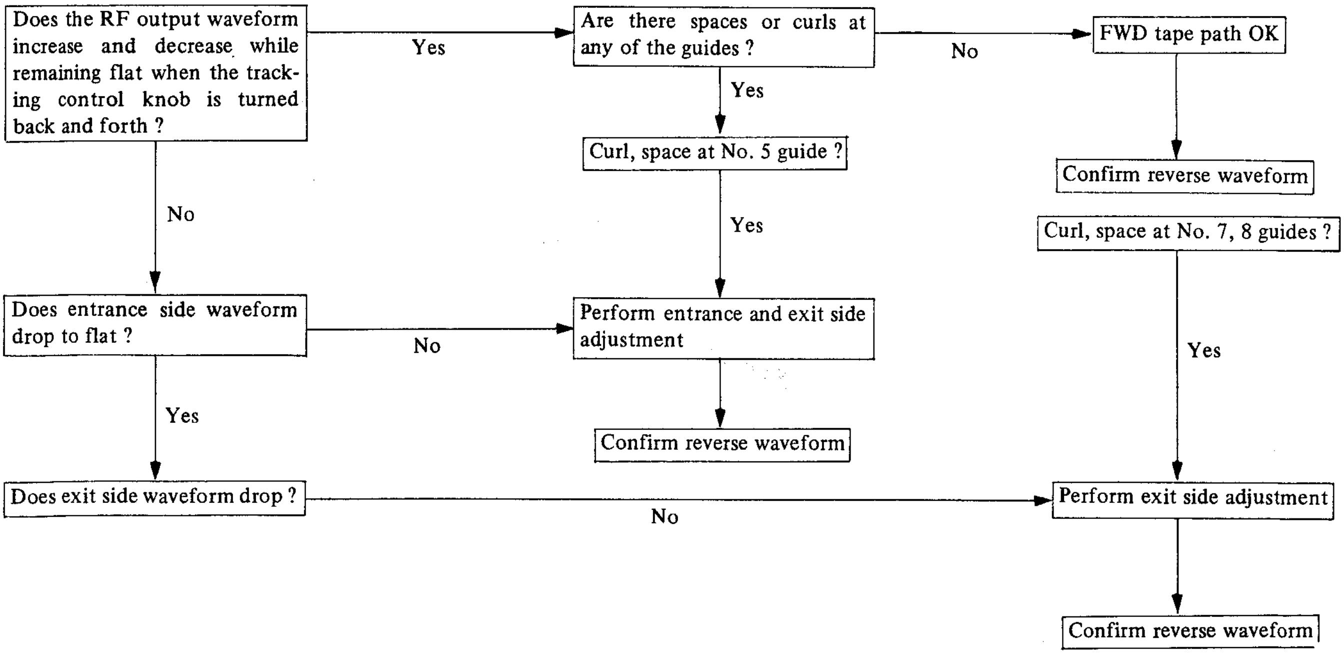

tape entrance side
turn
tracking control knob at maximum
(a)
tape exit side
turn
tracking control knob at maximum
(b)

Fig. 4-3.

Waveform Confirmation


Does the RF output waveform increase and decrease while remaining flat when the tracking control knob is turned back and forth ?
Yes
Are there spaces or curls at any of the guides ?
No
FWD tape path OK
Yes
Curl, space at No. 5 guide ?
Confirm reverse waveform
No
Yes
Curl, space at No. 7, 8 guides ?
Does entrance side waveform drop to flat ?
No
Perform entrance and exit side adjustment
Yes
Yes
Confirm reverse waveform
Does exit side waveform drop ?
No
Perform exit side adjustment
Confirm reverse waveform

4-1-2. Entrance Side Adjustment

Always perform the exit side adjustment as well as the entrance side adjustment. Fig. 4-4 illustrates the guides and adjustment locations.

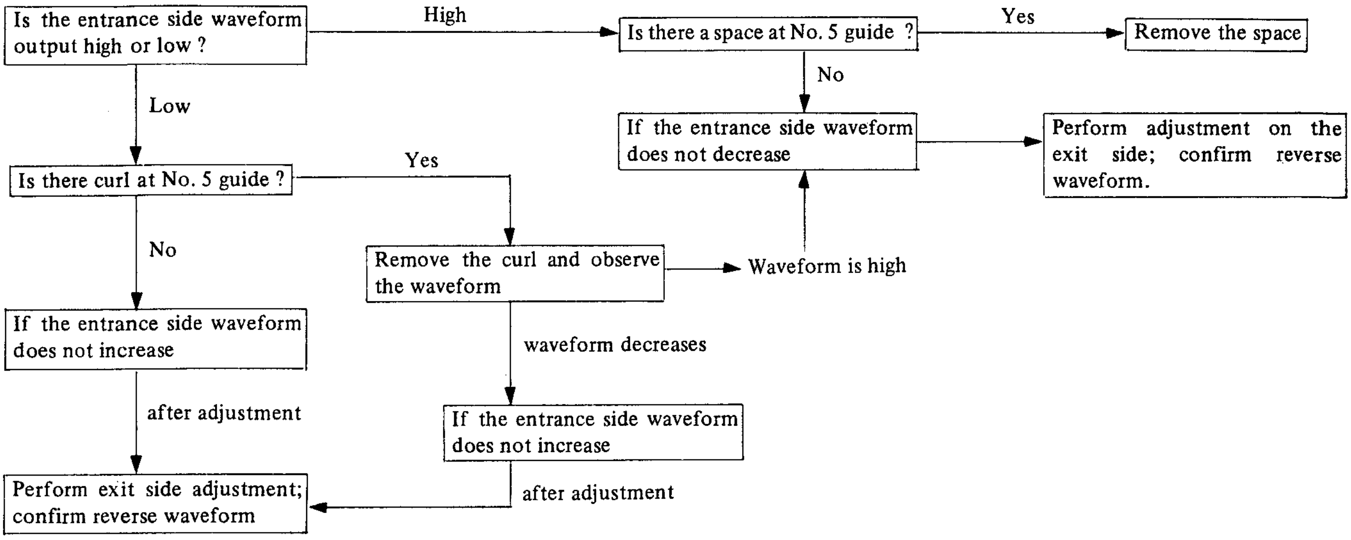
Turn the tracking control knob clockwise to lower the RF output waveform to about 60% of the maximum.

Note: Be sure to turn clockwise to lower the waveform. By doing this, the entrance side waveform will increase when the No. 5 guide is loosened, and when the No. 5 guide is lowered, the waveform will decrease.

1) First, screw the No. 4 guide down completely, then loosen the No. 6 guide to create a space and free the tape running.

2) Loosen the No. 5 guide lock screw ①, turn No. 5 guide so that there are no curls or spaces, and check the waveform.
If the waveform does not flatten, perform adjustments as follows.

ENTRANCE SIDE FLOW CHART


Is the entrance side waveform output high or low ?
High
Is there a space at No. 5 guide ?
Yes
Remove the space
No
If the entrance side waveform does not decrease
Perform adjustment on the exit side; confirm reverse waveform.
Low
Is there curl at No. 5 guide ?
Yes
Remove the curl and observe the waveform
Waveform is high
No
If the entrance side waveform does not increase
waveform decreases
after adjustment
If the entrance side waveform does not increase
Perform exit side adjustment; confirm reverse waveform
after adjustment

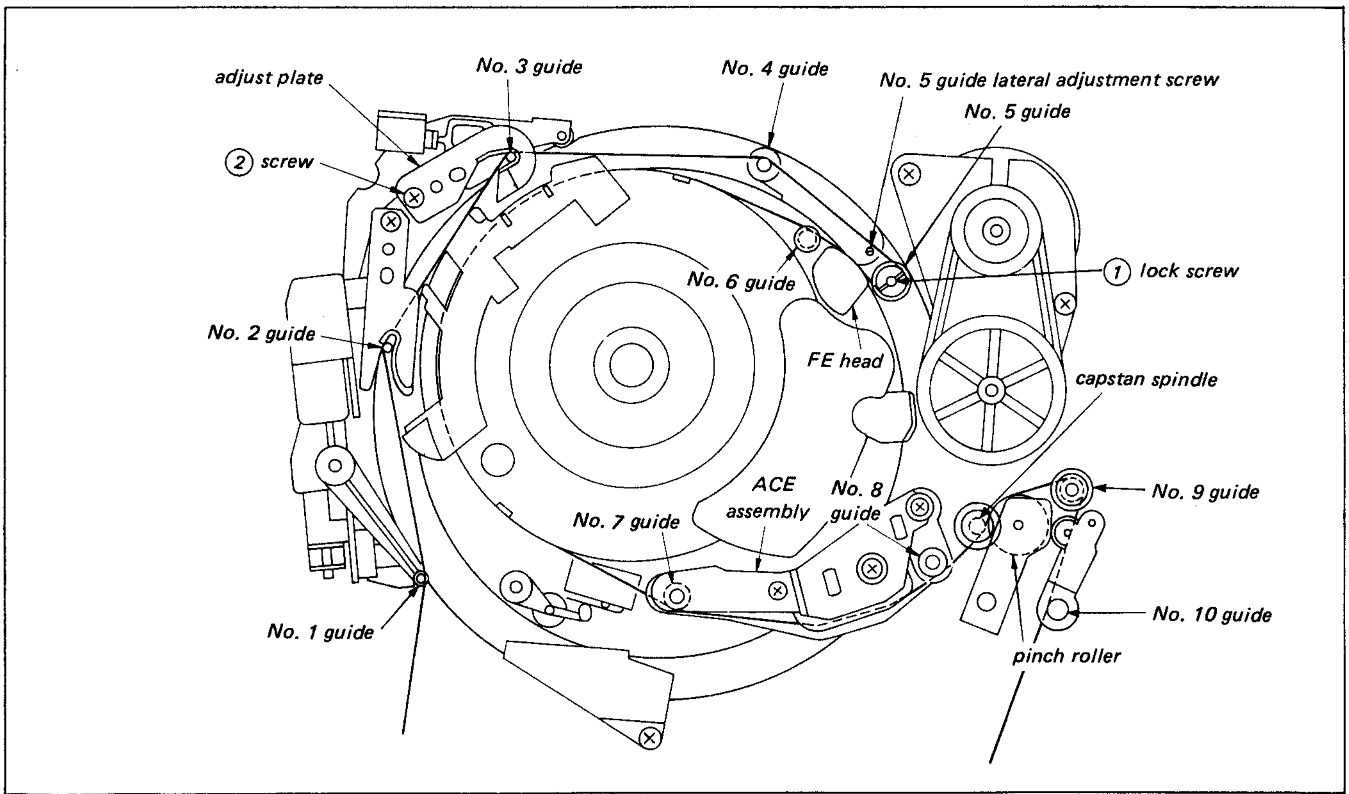

adjust plate
No. 3 guide
No. 4 guide
No. 5 guide lateral adjustment screw
No. 5 guide
② screw
① lock screw
No. 6 guide
No. 2 guide
FE head
capstan spindle
ACE assembly
No. 8 guide
No. 9 guide
No. 7 guide
No. 10 guide
No. 1 guide
pinch roller

Fig. 4-4.

[If the waveform entrance output does not increase]

1) Loosen the adjust plate screw ②on No. 3 guide, and move it towards the drum. When the waveform increases, tighten screw②.

2) Flatten the waveform with No. 5 guide.

[If the waveform entrance output does not decrease]

1) Move the No. 3 guide adjust plate away from the drum, and tighten screw② at the point just before the lower tension of the tape loosens.

2) Flatten the waveform with No. 5 guide lateral adjustment screw.

3) After turning and locking the No. 5 guide, flatten the waveform by raising the waveform entrance a little, and lock the No. 5 guide lock screw at this point. Press the No. 5 guide down with a screwdriver so that it does not turn when locking. (Fig. 4-5)

4) Check for curl or spaces at the No. 5 guide. If these appear, proceed with the following adjustments.

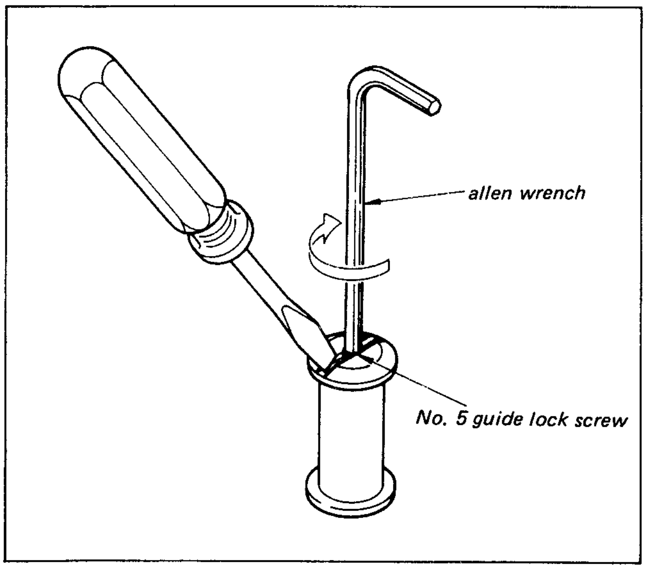


Fig. 4-5.

[If there is space]

Turn No. 4 guide counterclockwise to raise the tape and remove the space at No. 5 guide.

Note: Be careful not to create a large space at the bottom of No. 4 guide.

[If there is curl]

1) When there is a space at the bottom of No. 4 guide:
Lean the adjust plate of No. 3 guide toward the outside until the point just before the lower tape tension loosens.

2) When there is curl but no space at the bottom of No. 4 guide:
   - i) Confirm that No. 4 guide is not raised too high. Turn clockwise to lower if necessary.
   - ii) If this does not solve the problem, tighten No. 5 guide lateral adjustment screw by turning clockwise until the curl disappears.

4-1-3. Exit Side Adjustment

1) Turn the tracking control knob clockwise to lower the RF output waveform to about 60% of the maximum.

2) Raise No. 7, 8 guides to free the tape running, and check the waveform. (This waveform is called "exit free waveform".)

Note: Be careful not to raise the guides too much. They should be raised about 0.3 ~ 0.5 mm, and also, the tape should not touch the ACE head bottom flange. (Fig. 4-6)
   - i) If the exit free waveform is within the range illustrated in Fig. 4-7(a), (b), process with exit side adjustment.
   - ii) If it is not within the specified range, follow the adjustment procedure in 4-3.

3) Flatten the waveform with No. 7 guide, and match No. 8 guide to the tape. (Lower the guide to the point just before the waveform changes, and where there is no curl.)

4) Confirm that there is no curl at No. 7, 8 guides in forward mode.

5) Confirm that curl and space do not appear at No. 8 guide in reverse mode. If curl or space appear, adjust with No. 9 guide, and perform the exit side adjustment again.

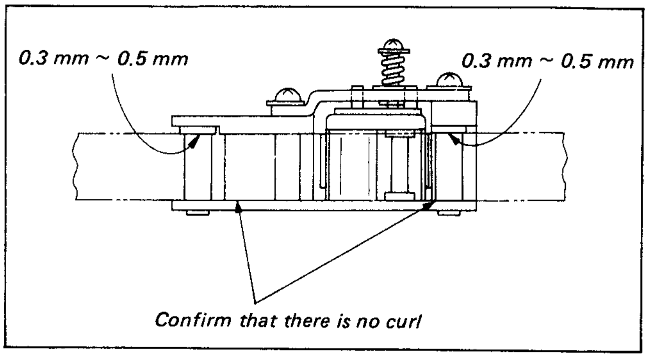


Fig. 4-6.

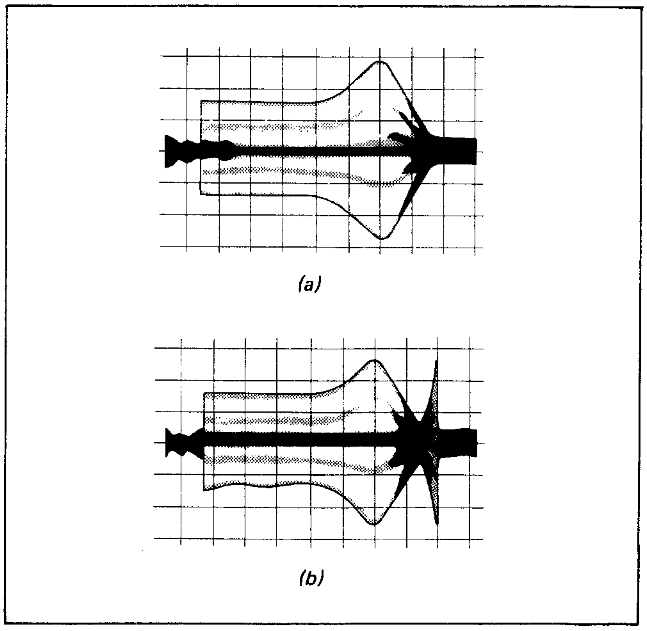


Fig. 4-7.

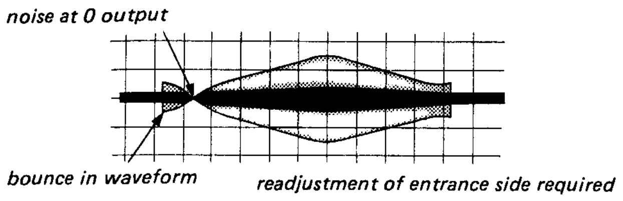
4-1-4. Reverse Waveform Confirmation

1) Confirm that the entrance and exit side waveforms do not bounce when the tracking control knob is turned (less than 30°) in the reverse mode. (Fig. 4-8)

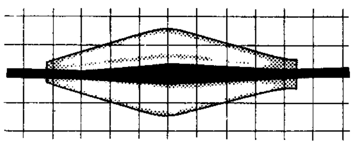
2) If there is bounce in the entrance side waveform, readjust the entrance side in the forward mode, and if there is bounce in the exit side waveform, readjust the exit side.

3) Confirm the waveform in the reverse mode again.

Note: When readjusting, be sure to return the tracking control knob to the center position.



(a) This kind of waveform should appear when the tracking control is turned.



(b) correct reverse waveform

Fig. 4-8.

4-2. ADJUSTMENT FOR REMOVAL OR REPLACEMENT OF THE ACE ASSEMBLY

Perform the following adjustments when removing or replacing the ACE assembly.

4-2-1. Tracking Adjustment

1) Turn the tracking control knob clockwise to lower the RF output waveform to about 60% of the maximum.

2) Replay the tracking portion of the alignment tape (KR5-2H), raise No. 7, 8 guides about 0.3 ~ 0.5 mm, and check the exit free waveform of the RF output waveform.

Note: Be sure that the tape does not touch the bottom flange of the ACE assembly.

   i) If the waveform is within the range illustrated in Fig. 4-7(a), (b), proceed with the adjustment.
   ii) If the exit free waveform appears as shown in Fig. 4-10, turn the ACE lateral adjustment screw clockwise (less than 30°) until the waveform is within the range illustrated in Fig. 4-7(a), (b). (See Fig. 4-9)
   iii) If the exit free waveform appears as shown in Fig. 4-11, turn the ACE lateral adjustment screw counterclockwise (less than 30°), until the waveform is within the specified range.

4) Turn the No. 7 guide to flatten the waveform, and match the No. 8 guide to the tape.
(Lower the guide until the point just before the waveform changes.)

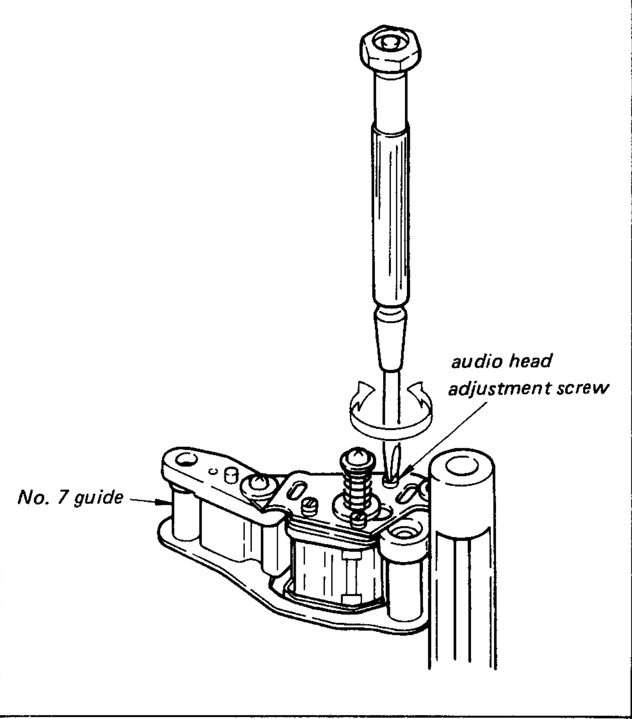


Fig. 4-9.

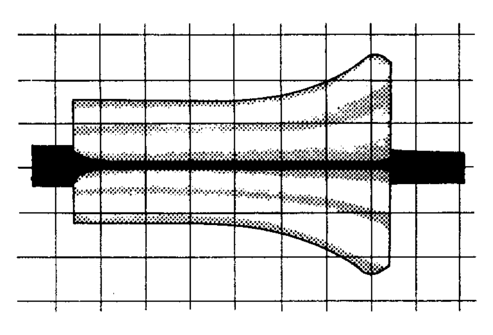


Fig. 4-10.

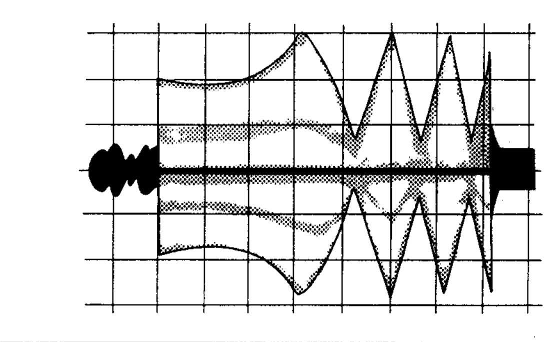


Fig. 4-11.

4-2-2. Audio Azimuth Peak Adjustment

1) Connect the oscilloscope as follows:
   CN804 . . . 11 pin (MA-3 board)
   Replay the 5 kHz portion of the alignment tape (KR5-2H).

2) Turn the azimuth adjustment screw (Fig. 4-12) so that the amplitude of the 5 kHz waveform is maximum.

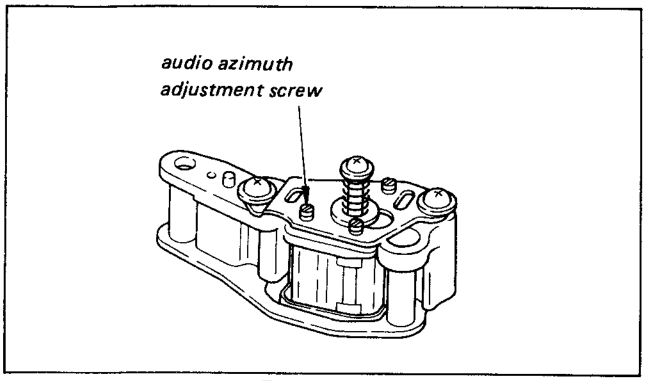


Fig. 4-12.

4-2-3. CTL Head (ACE Assembly) Position Adjustment

This adjustment is both mechanical and electric: mechanically, it is the adjustment of the CTL head position, and electrically, it is the tracking control center adjustment. The procedure involves performing the electrical adjustment first, then the head position adjustment.

1) Connect the oscilloscope as follows:
   1ch: CN3 . . . 3 pin (SF-5 board)
   2ch: CN804 . . . 11 pin (MA-3 board)
   external trigger: CN3 . . . 5 pin (SF-5 baord)

2) Replay the tracking portion of the alignment tape (KR5-2H).

3) Turn the tracking control knob back and forth, and confirm that the output waveform level is maximum at the center click position, and that the 0 level of the audio signal is at the point where the RF output waveform Bch waveform appears, as shown in Fig. 4-13. If adjustment is necessary, proceed as follows.

4) Tracking Control Center Adjustment (Refer to Electrical Adjustments, 5-3-3, 4)

5) CTL Head Position Adjustment
   Set the tracking control knob at the center click position and loosen the two ACE assembly position adjustment screws ①. As shown in Fig. 4-14, slide the ACE assembly with a screwdriver until it is in the position shown in Fig. 4-13 and the RF output waveform is maximum. Tighten the screws when this position is obtained.

6) Replay the colour bars of the alignment tape and check the picture quality.

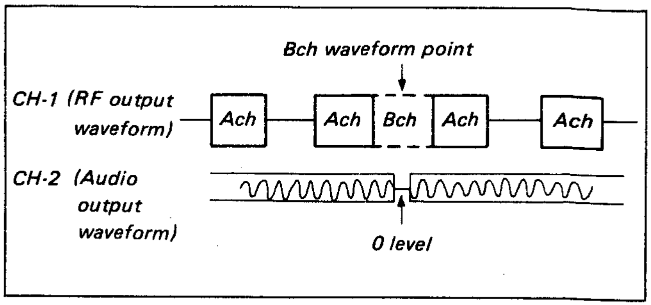


Fig. 4-13.

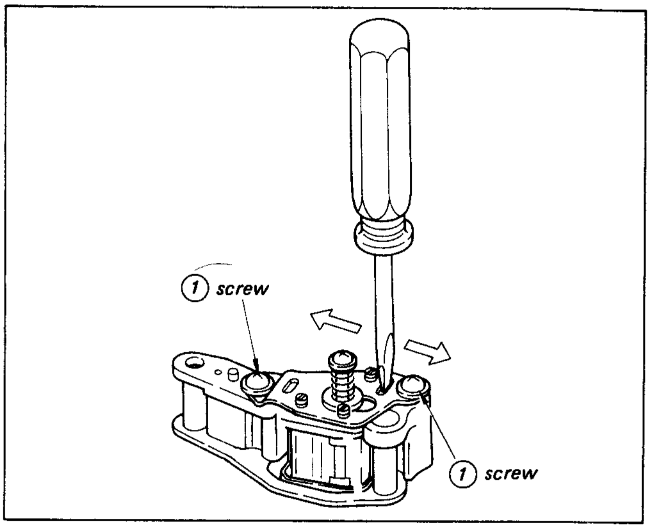


Fig. 4-14.

4-2-4. Audio Head (ACE Assembly) Height Adjustment

Perform this adjustment only after completing the exit side tracking adjustment.

1) Oscilloscope connection: 1ch: CN804 . . . 11 pin (MA-3 board)
   Replay the 5 kHz portion of the alignment tape (KR5-2H).

2) Turn the audio head height adjustment screw ① and the lateral adjustment screw ② (Fig. 4-15) until the aduio output waveform amplitude is maximum.
   Note: Both of these adjustment screws should be turned in the same direction at the same angle, less then 30°.

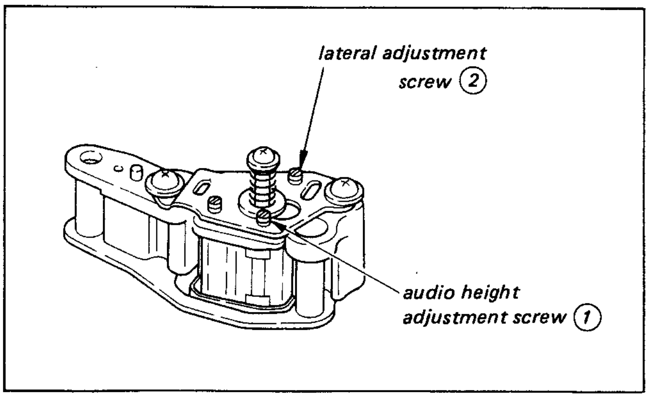


Fig. 4-15.

4-3. ADJUSTMENT FOR REMOVAL OR REPLACEMENT OF THE CAPSTAN MOTOR

1) Perform the vertical adjustment of the capstan spindle according to 3-4, Replacement and Adjustment of Capstan Motor.

2) Replay the tracking portion of the alignment tape (KR5-2H). Connect the oscilloscope as follows:
   1ch: CN3 . . . 3 pin (SF-5 board)

3) Turn the tracking control knob clockwise to lower the RF output waveform to about 60% of the maximum.

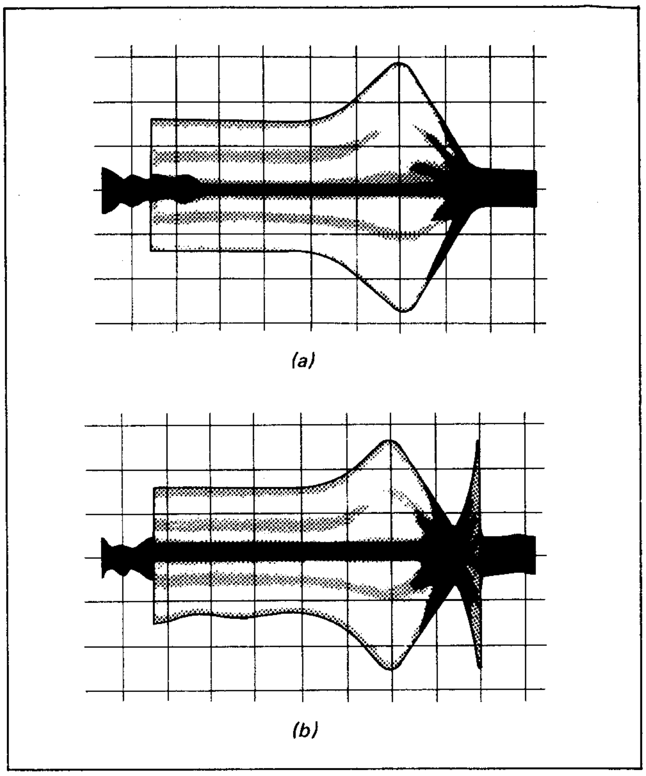
4) Raise No. 7, 8 guides a little, and check the exit free waveform.
   - i) If the exit free waveform is within the range indicated in Fig. 4-16(a), (b), proceed from step 5).
   - ii) If the peak of the exit free waveform is smaller than that illustrated in Fig. 4-16(a) (e.g.: Fig. 4-17), loosen the capstan lock screw, then turn the adjustment screw counterclockwise (less then 60°) until the waveform is within the specifed range.
   - iii) If the peak shape of the exit free waveform differs from that shown in Fig. 4-16(b) (e.g.: Fig. 4-18), loosen the lock screw, then turn the capstan adjustment screw clockwise (less than 60°) until the waveform is within the specified range.

   Note: After turning the capstan adjustment screw, wait until the waveform stabilizes (about 10–15 seconds) before continuing with the adjustment.

5) Lock the capstan lock screw. (Turn clockwise until it stops, then turn a little more.)

6) Flatten the waveform with No. 7 guide, and match No. 8 guide to the tape.

7) Confirm and adjust according to 4-1-3, exit side adjustment procedure, items 4), 5).


(a)

(b)

Fig. 4-16.

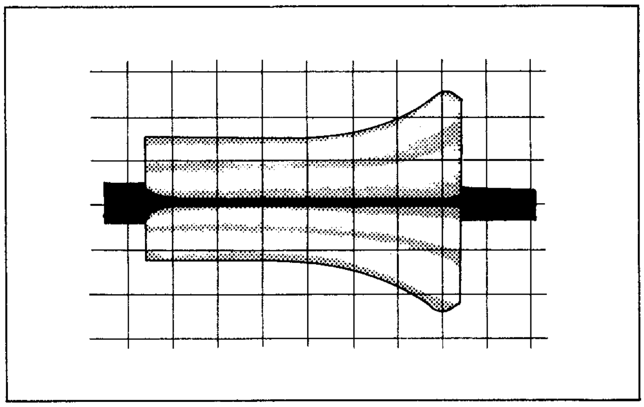


Fig. 4-17.

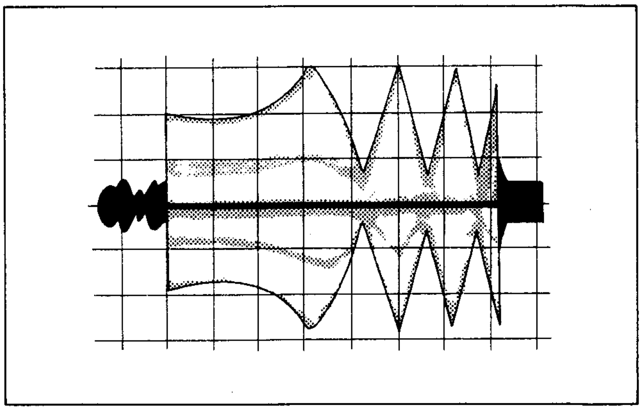


Fig. 4-18.

SECTION 5
ELECTRICAL ALIGNMENT

All the electrical alignment can be performed by using the equipment mentioned below, the alignment tape, and the PAL colour bar signal (100%).

[Equipment Required]

(1) Colour monitor TV

(2) Oscilloscope, Dual-trace, Bandwidth . . more than 10 MHz with delay mode

(3) Frequency Counter

(4) PAL Colour-Bar Generator

(5) Digital voltmeter

(6) VOM (20 kΩ/V)

(7) Audio Signal Generator

(8) Attenuator

(9) Alignment Tape, type: KR5-2H, Code No. 8-969-995-52

(10) Alignment Tool (Adjusting screwdriver for semi-fixed resistors and coils)
Code No. 7-700-733-01

[Setup for Alignment]

In this alignment, video signals obtained from the pattern generator or the timer tuner unit will be used as alignment signals. Therefore, the video output signals should be within the specifications. Verify video signals by connecting an oscilloscope to pin 1 of CN804 NOTE i on the MA-3 board, or to pin ㉓ of CN802 NOTE ii. Check that the video signals are flat when the amplitude of the horizontal sync signal is about 0.3V, the amplitude of the video portion is about 0.7V, and the amplitude of the burst signal is about 0.3V.
The video signal(colour-bar signal)used in this alignment is shown in Fig. 5-1.

Notes: i) When the external power supply is connected to DC IN jack.
ii) When the tuner timer unit is connected to the ACCESSORY CONNECTOR.

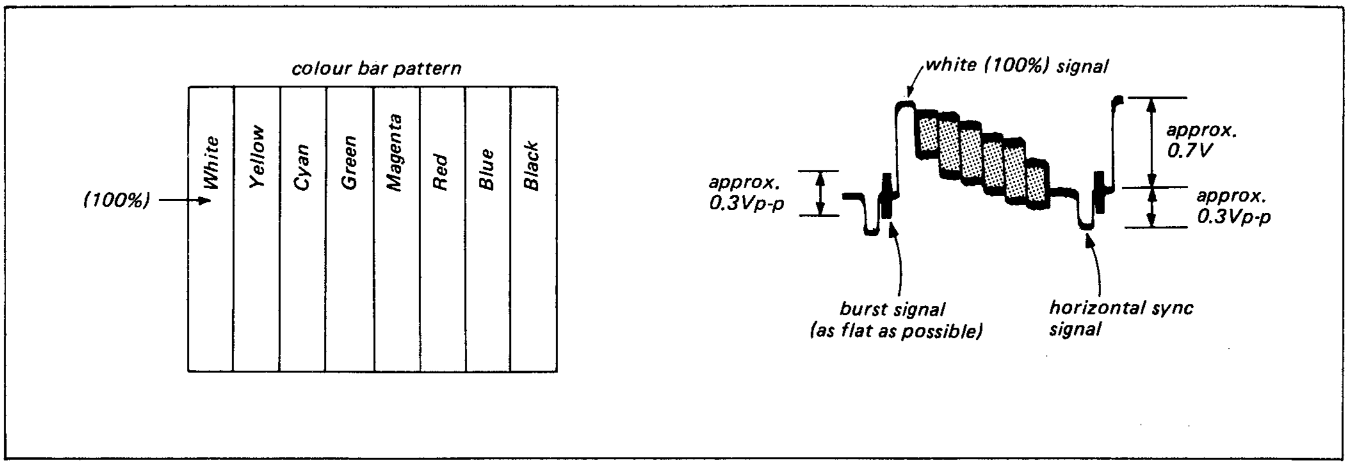


Fig. 5-1. Colour-bar signal of pattern generator

[Alignment Tape]

KR5-2H

	Video signal	Audio signal	Playing time	Use for
1.	Colour bars	3 kHz – 5 dB	5 min	General performance, tape speed checks, switching position adjustment.
2.	Monoscope	333 Hz – 25 dB	5 min	Video head dihedral, audio level adjustment.
3.	RF sweep	5 kHz – 25 dB	5 min	Video, audio frequency characteristics, audio azimuth adjustment marker: 1, 2, 3.58, 4.5, 5.2 MHz
4.	Tracking 1 MHz (CH-B) *1 (Channel B is inserted in every 3 frames.)	1 kHz – 5 dB *2 (Signal is dropped out in the positions where channel B is inserted.)	5 min	Tracking, Audio height adjustments CTL Position check (Check if *1 and *2 are the same position.)

[Colour-Bar Signal]

The 100% colour bar signal recorded on the Alignment tape is shown in Fig. 5-2.

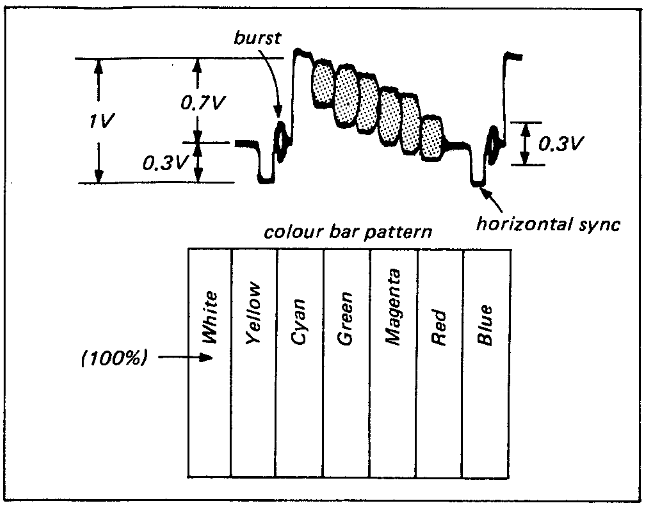
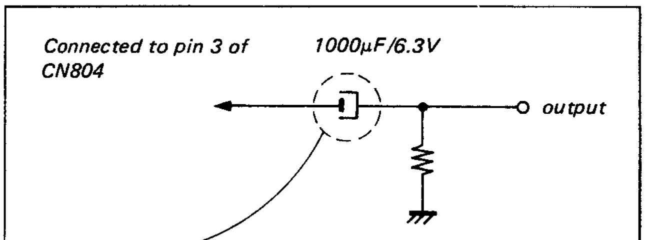

burst
1V
0.7V
0.3V
0.3V
colour bar pattern
horizontal sync
(100%)
White
Yellow
Cyan
Green
Magenta
Red
Blue

Fig. 5-2. Colour bar signal recorded on the alignment tape

[75Ω Terminating Method]

To terminal the video output terminal (pin ③ of CN804), follow the steps shown in Fig. 5-3.


Connected to pin 3 of CN804
1000μF/6.3V
output

Note: *The machine may be damaged if it is terminated in 75Ω before cutting the DC component.*

Fig. 5-3. 75Ω terminating circuit

[VR Alignment Tool Screwdriver]

Use the tool screwdriver supplied for alignment of semi-fixed VRs and inductances on each printed circuit board. An ordinary screwdriver is too large and is difficult to use when adjusting VRs from the print pattern side of a board. The special alignment tool screwdriver is shown in Fig. 5-4.

The metal blade of the screwdriver is used for variable resistors and trimmer capacitors.

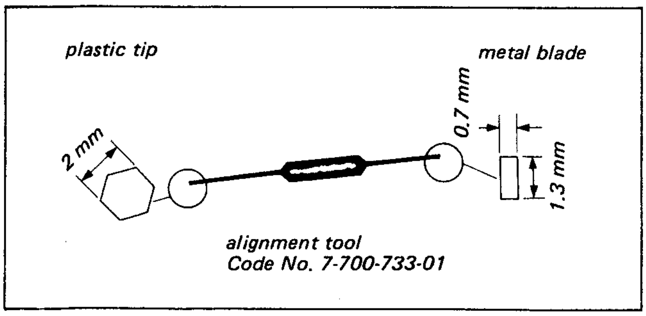

plastic tip
metal blade
2 mm
0.7 mm
1.3 mm
alignment tool
Code No. 7-700-733-01

Fig. 5-4. Alignment tool screwdriver

[Required Levels and Impedances of Input and Output]

Inputs and outputs

CAMERA connector 14-pin, Sony K-type connector
Video in: 1 Vp-p $^{+1.0}_{-0.5}$ Vp-p
75 ohms unbalanced, sync negative
Video out: 1 Vp-p ± 0.1 Vp-p
75 ohms unbalanced, sync negative
Audio in: −20 dBs
(0 dBs = 0.775 V rms)
Audio out: −5 dBs (at load impedance 100 kilohms)
Output impedacne: less than 10 kilohms
Power supply output: 12V DC

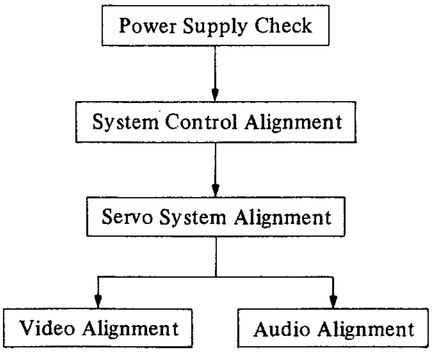
ACCESSORY connector 26-pin connector
Video in: 1 Vp-p $^{+1.0}_{-0.5}$ Vp-p
75 ohms unbalanced, sync negative
Video out: 1 Vp-p ± 0.1 Vp-p
75 ohms unbalanced, sync negative
Audio in: −10 dBs
Input impedance 100 kilohms
Audio out: −5 dBs (at load impedance 100 kilohms)
Output impedance: less than 10 kilohms
Power supply input: 12V DC

MIC input Minijack
−60 dBs, for low-impedance microphone

EARPIECE output Minijack
−26 dBs, for 8-ohm earpiece

[Alignment Sequence]

The alignment should be performed following the sequence below.


Power Supply Check
System Control Alignment
Servo System Alignment
Video Alignment
Audio Alignment

5-1. POWER SUPPLY CHECK (MA-3 Board)

Measure in E-E mode (power supply switch ON).

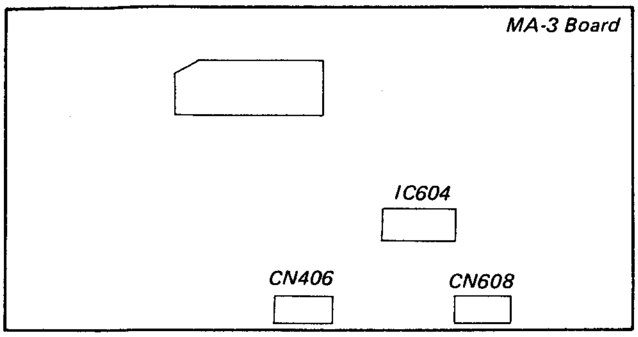


Fig. 5-1-1. Component layout

1. +12V Check
   UNREG 12V LINE shall be above 11.5V.
2. REG 9V Check
   Pin ① of CN608 shall be 9.0V ± 0.2V.
3. REG 5V Check
   Pin ⑭ of IC604 shall be 5V ± 0.3V.

5-2. SYSTEM CONTROL ALIGNMENT AND CHECK (MA-3 Board)

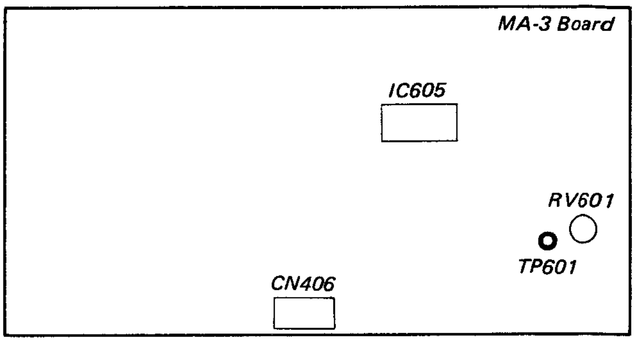


Fig. 5-2-1. Component layout

1. Battery Down (Prevention of Excess Discharge) Alignment
   Mode: E-E
   Digital voltmeter: UNREG 12V LINE
   (1) Decrease the external power supply voltage and set at 10.8V.
   (2) Connect VOM to TP601 (Pin ⑬ of IC608)
   (3) Turn RV601 fully clockwise (↻) as seen from the pattern side.
   (4) Turn RV601 counterclockwise (↺) and set so that VOM changes from "H . . . . . about 5V" to "L . . . . . about 0V."

   Note: VTR power supply is automatically cut off when the "L" state continues for more than about 30 seconds.

   (5) Return the external power supply voltage to 12V and again slowly decrease. Check that TP601 changes from "H" → "L" when the voltage reaches 10.8V (pin ① of CN406).
2. Clock Frequency Check
   Mode: E-E
   Signal: None
   Frequency counter: Pin ④ of IC605
   Check: Within 3.9 MHz ± 0.1 MHz

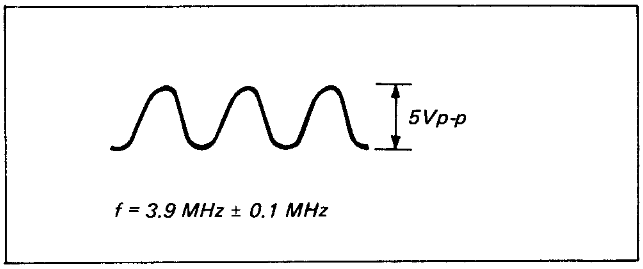


Fig. 5-2-2. Clock frequency

5-3. SERVO SYSTEM ALIGNMENT

Alignment Sequence

1. Reel servo system alignment
2. Drum servo system alignment
3. Capstan servo system alignment
4. Slow servo system alignment

5-3-1. Reel Servo System Alignment

1) FAST-FWD/REW Speed Alignment (MA-3 board)
Using VOM (20 kΩ/V)
Mode: FAST-FWD
VOM: Pin ⑦ of IC205

[Alignment method]

i) FAST-FWD the tape center section (with the tape wound equally on T- and S-side reels)
ii) Adjust to 4.3V ± 0.2V with RV201.
iii) Set up the REW mode at the tape center section.
iv) Check that VOM shows 4.3V ± 0.5V.

Using frequency counter:
Mode: FAST-FWD
Frequency counter: D202 anode

[Alignment method]

i) FAST-FWD the tape center section (with the tape wound equally on T- and S-side reels)
ii) Adjust to 380 Hz ± 30 Hz with RV201.
iii) Connect the frequency counter to the anode of D201.
iv) Set up the REW mode at the tape center section.
v) Check that the frequency is 380 Hz ± 50 Hz.

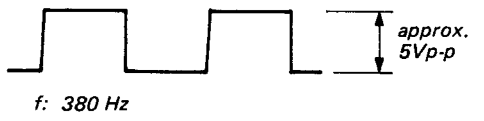


Fig. 5-3-1. Alignment of FAST-FWD/REW speed

2) FWD Back Tension Alignment (MA-3 Board)
See "Mechanical Adjustment"

5-3-2. Drum Servo System Alignment

1) Drum Free Speed Adjustment (MA-3 Board)
Mode: Playback
Signal: Alignment tape colour bar, or monoscope
Oscilloscope: CH-1 TP409 (pin ⑬ of IC401)
CH-2 TP401 (pin ㊴ of IC401)

[Alignment method]

Adjust to 553μsec ± 10μsec with RV402 (See Fig. 5-3-2)

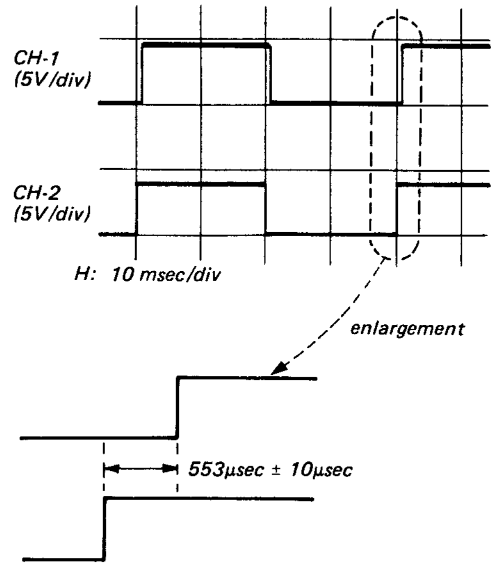


Fig. 5-3-2. Drum free speed adjustment

2) RF Switching Position Adjustment (MA-3 Board)
Mode: Playback
Signal: Alignment tape colour bar or monoscope
Oscilloscope CH-1 TP401 (pin ㊴ of IC401)
CH-2 Pin ㊵ of IC401

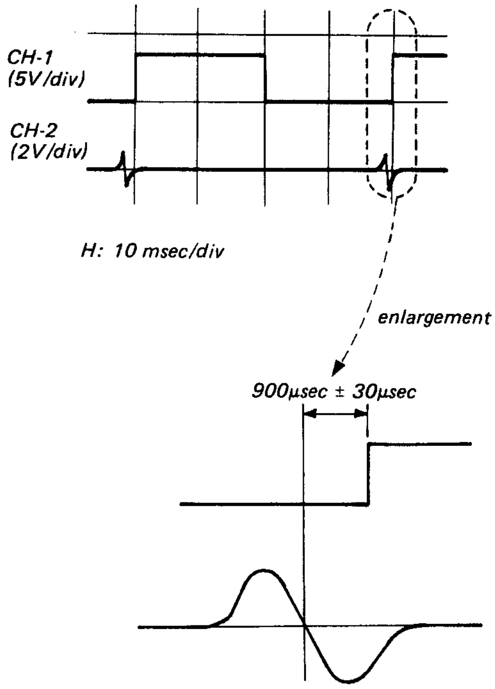


Fig. 5-3-3. RF switching position adjustment (1)

[Adjustment method]

i) Adjust to 900μsec ± 30μsec with RV401. (See Fig. 5-3-3)
ii) Change connection of CH-2 only to pin ㉜ of IC401.
iii) Adjust to 900μsec ± 30μsec with RV403. (See Fig. 5-3-4)

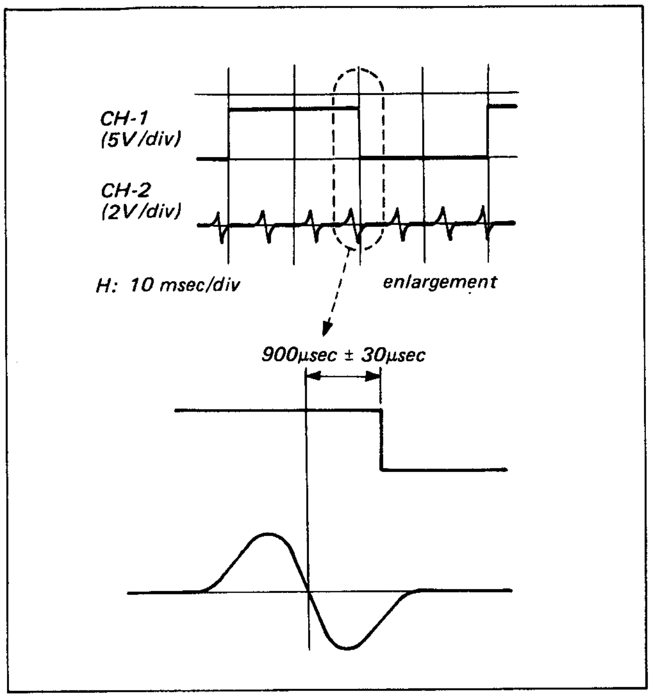

CH-1
(5V/div)
CH-2
(2V/div)
H: 10 msec/div
enlargement
900μsec ± 30μsec

Fig. 5-3-4. RF switching position adjustment (2)

iv) Set up the pause mode and feed one frame by pressing the FORWARD ► button. Observe the amount of V-jitters. Again press the FORWARD ► button to feed one frame and compare the amount of V-jitter with the previous amount. Perform fine adjustment if they are not identical with RV403.

3) PICTURE SEARCH, Drum Free Speed Adjustment (MA-3 Board)

- Adjust both FWD/REVERSE mode.
- REVERSE is indicated by (   ).

Mode: PICTURE SEARCH (FWD/REVERSE)
Signal: Alignment tape colour bar or monoscope
Frequency counter: Pin ④ of CN2

[Adjustment method]

Adjust to 15.625 kHz ± 0.05 kHz with RV410 (RV420) (See Fig. 5-3-5).

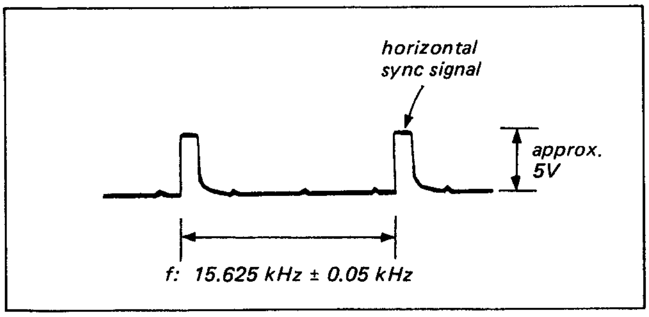

horizontal
sync signal
approx.
5V
f: 15.625 kHz ± 0.05 kHz

Fig. 5-3-5. PICTURE SEARCH, drum free speed adjustment

5-3-3. Capstan Servo System Alignment

1) Capstan DC Bias Adjustment (MA-3 Board)

Mode: Playback
Signal: Alignment tape colour bar or monoscope
Oscilloscope: Pin ⑳ of IC401

[Adjustment method]

Adjust to the relevant duty (ratio for A and B) in the play mode with the RV as shown in Table 1.

Playback Mode	Adjustment RV	Duty
PB	RV407	50%
DOUBLE SPEED	RV405	50%

Table 1.

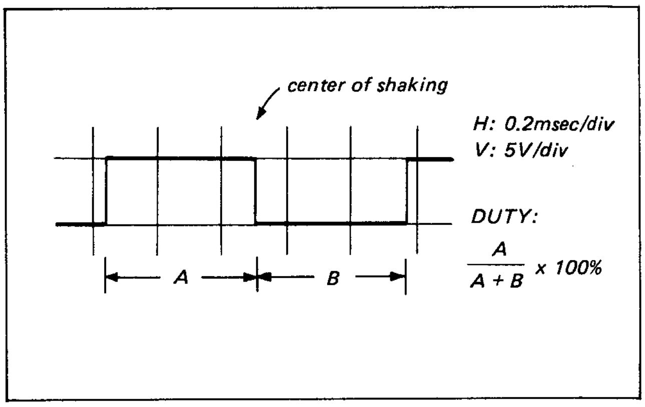

center of shaking
H: 0.2msec/div
V: 5V/div
DUTY:
A / (A + B) x 100%
A
B

Fig. 5-3-6. Capstan DC bias adjustment

2) PICTURE SEARCH, Capstan DC Bias Adjustment (MA-3 Board)

Mode: PICTURE SEARCH (FWD)
Signal: Alignment tape colour bar or monoscope
Frequency counter: TP407 (Pin ① of IC408)

[Adjustment method]

i) Adjust to 1613 Hz ± 5 Hz with RV409. (See Fig. 5-3-7)

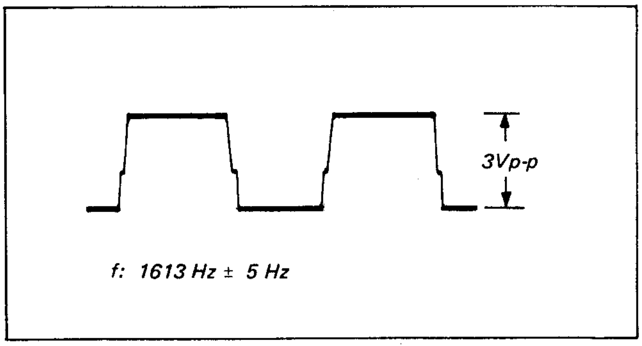

3Vp-p
f: 1613 Hz ± 5 Hz

Fig. 5-3-7. PICTURE SEARCH, capstan DC bias adjustment

3) FG Amp DC Bias Adjustment (MA-3 Board)
Mode: Playback + x2 (Double speed)
Signal: Alignment tape colour bar or monoscope

[Adjustment method]

i) Denote the voltage at TP405 (pin ⑪ of IC408) by V1.
ii) With TP403 and TP415 shorted, V2 denotes the voltage at TP405.
iii) Adjust RV417 to attain a voltage level of V1 = V2.
iv) V3 denotes the voltage at TP402 (pin ⑦ of IC408).
v) With TP403 and TP415 disconnected, V4 denotes the voltage at TP402.
vi) Adjust RV416 to attain a voltage level of V3 = V4.

4) Tracking Center Adjustment (MA-3 Board)
Mode: Playback
Signal: Alignment tape colour bar, or monoscope
Oscilloscope: CH-1 TP409 (pin ⑬ of IC401)
CH-2 TP411 (pin ⑮ of IC401)

[Adjustment method]

i) Set the TRACKING knob to the center click position.
ii) Adjust to 7.05msec ± 0.05msec with RV414. (See Fig. 5-3-8)

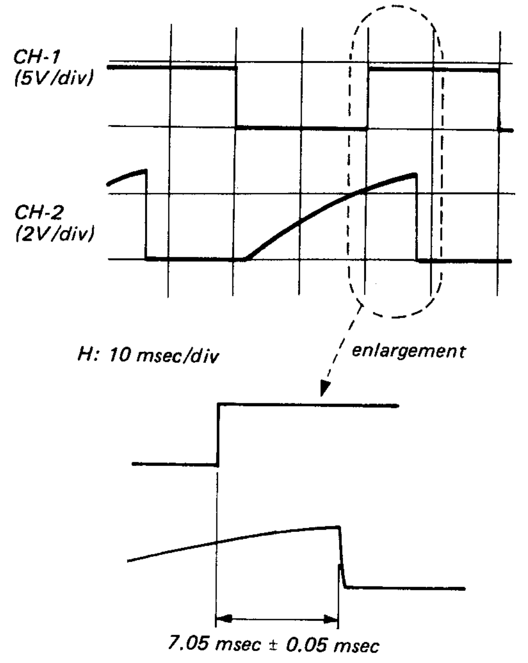


Fig. 5-3-8. Tracking center adjustment

5) Tracking FIX Adjustment (MA-3 Board)
Mode: Recording
Signal: Arbitrary signal
Oscilloscope: CH-1 TP409 (pin ⑬ of IC401)
CH-2 TP411 (pin ⑮ of IC401)

[Adjustment method]

i) Set the TRACKING knob to the center click position.
ii) Adjust to 7.05msec ± 0.05msec with RV413. (See Fig. 5-3-9)

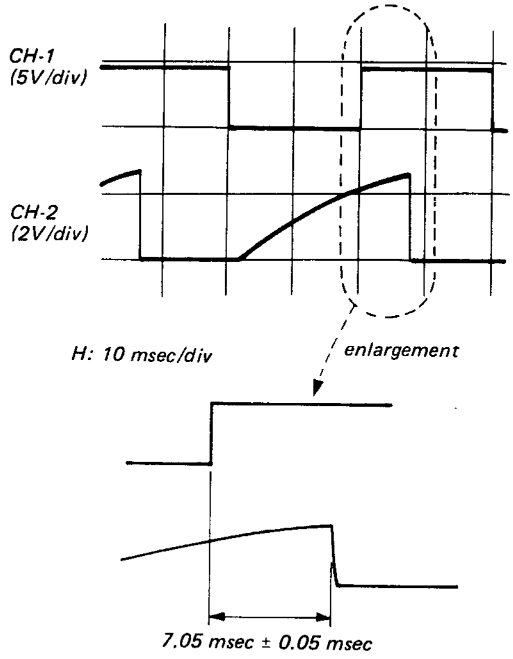


Fig. 5-3-9. Tracking FIX adjustment

6) CTL Delay Adjustment (MA-3 Board)

- Adjust using a self-recorded tape.

Mode: Playback + Pause
Signal: Colour bar signals recorded in βII mode.

[Adjustment method]

i) Set the TRACKING knob to the center click position.
ii) Adjust RV415 so that noise bars on the TV monitor screen disappear from the screen top or bottom (or are kept to a minimum) while pressing the REVERSE ◄ button (See Fig. 5-3-10)

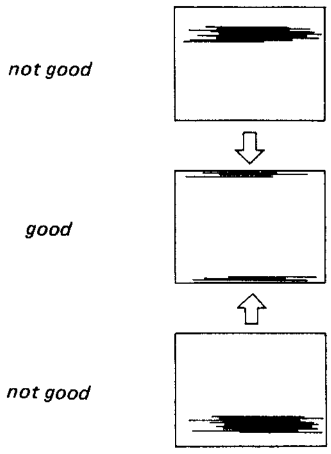


Fig. 5-3-10. CTL delay adjustment

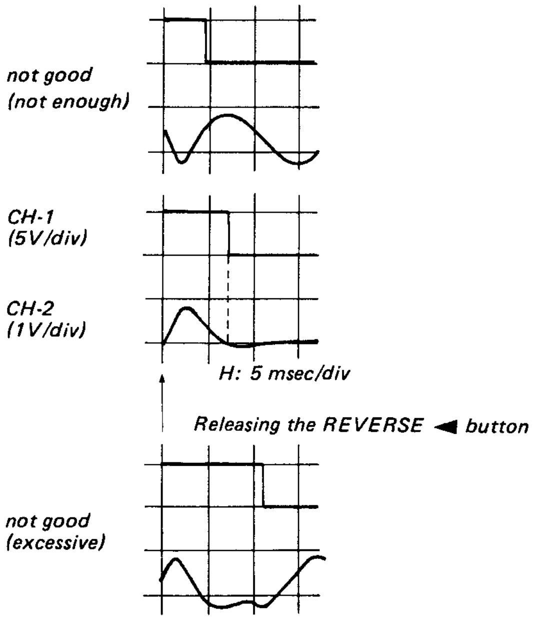
5-3-4. Slow Servo System Alignment

1) Capstan Brake Alignment (LS-8 and MA-3 Boards)
Mode: Playback + Pause
Signal: Recorded tape
Oscilloscope: CH-1 TP205 (LS-8 Board)
CH-2 TP402 or TP405 (MA-3 Board)
Sweep mode: NORMAL
Trigger slope: +

[Adjustment method]

i) Press the REVERSE ◀ button for more than one second, then release. (Adjust the trigger level of the oscilloscope so that a waveform appears.)

ii) Repeat the process of pressing the REVERSE ◀ button for one second --- releasing --- pressing, and adjust to optimum state as shown in Fig. 5-3-11 with RV209. (See Fig. 5-3-11)



Note: *So adjust RV209 to the Point where the FG signal disappears at the position where the brake pulse falls.*

Fig. 5-3-11. Capstan brake alignment

2) Tracking Adjustment (LS-8 Board)
- Adjust using the self-recorded tape.
- Adjust both the FWD and RVS modes.

Mode: Playback + Pause
Signal: Colour bar mentioned above

[Adjustment method]

i) Set the TRACKING knob to the center click position.

ii) Press the FORWARD ▶ button for about one second, then release it. (The pause mode will be set) Adjust with RV202 so that noise bars on the TV monitor screen are reduced to a minimum on the bottom of the screen. (See Fig. 5-3-12).

iii) Press the REVERSE ◀ button for about on second, then release it. (The pause mode will be set) Adjust with RV203 so that noise bars on the TV monitor screen are reduced to a minimum on the bottom of the screen. (See Fig. 5-3-12).

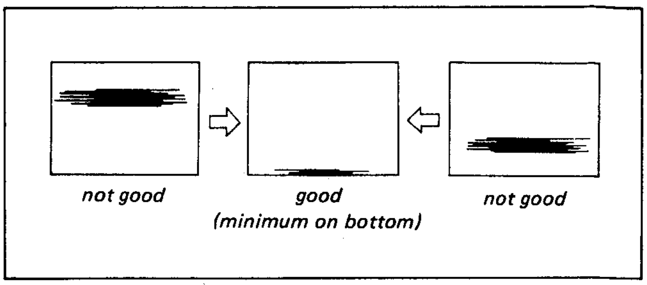


Fig. 5-3-12. Tracking adjustment

3) Edit Adjustment (MA-3 and LS-8 Boards)
Mode: Record
Signal: Arbitrary signal
Oscilloscope: Pin ④ of IC401 on MA-3 board
External trigger: pin ㉑ of IC401 on MA-3 board
Trigger slope: –
Input: DC range
Sweep mode: NORMAL

[Adjustment method]

i) Set up the PAUSE mode. (more than 3 sec)

ii) Push the PAUSE button again to clear the PAUSE mode (adjust the trigger level of the oscilloscope to triggerit), and adjust RV205 on the LS-8 board until the time T between the end of pause to the waveform rise point becomes a maximum.

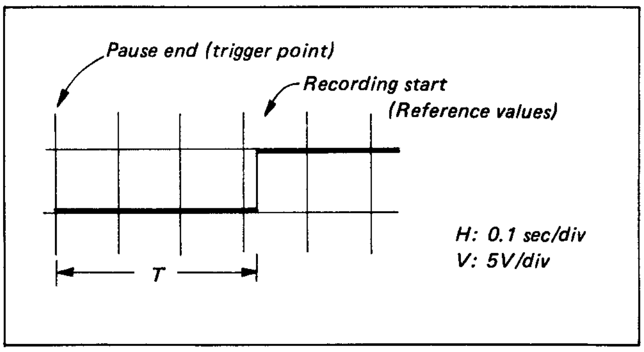


Fig. 5-3-13. Edit adjustment

iii) Repeat; PAUSE → release of PAUSE two or three times, and check that the result meets Paragraph (ii).

iv) Make self-recording the playback and check that edits are free of noise.

4) Slow Speed Adjustment (LS-8 Board)
Mode: Playback + Pause
Signal: Alignment tape colour bar, or monoscope
VOM (20kΩ/V): MA-3 board pin 2 of CN407

[Adjustment method]

i) Turn RV210 fully clockwise (↻) as seen from the pattern side.

ii) Adjust to 3.0V ± 0.2V with RV211 while pressing the SLOW I▶ button.

iii) Adjust RV210 so that noise bars on the monitor screen progress about four times per second from top to bottom while pressing the SLOW I▶ button.

Note: The VOM voltage decreases after making the adjustment in Paragraph (3). However, there is no need for readjustment.

5-4. VIDEO SYSTEM ALIGNMENT

As a rule, first the playback system is aligned with an alignment tape to check that it operates normally, then the recording system is aligned.

The alignment sequence is shown below. The Y signal and chroma signal systems are aligned for both playback and recording systems.

Colour video signals supplied by the pattern generator or timer tuner unit are used as video input signals for video system alignment in the record mode. Check that the sync and colour burst signals conform to the specifications designated in "Set-up for Alignment" in Fig. 5-1.

[Playback System Alignment]

1. Playback frequency characteristic adjustment
2. Playback video level adjustment
3. Y-Comb and DOC level adjustment
4. Shift adjustment
5. Expand adjustment
6. Chroma comb filter adjustment
7. Converter balance adjustment
8. White peak clip adjustment

[Slow Motion Playback System Alignment]

1. JOG AFC adjustment
2. JOG level adjustment

[Record System Alignment]

1. Sync and peak AGC adjustment
2. Carrier set adjustment
3. Deviation adjustment
4. Y record current adjustment
5. Chroma reference frequency adjustment
6. Chroma record current adjustment
7. Compress adjustment
8. Dark clip adjustment
9. White clip adjustment
10. Chroma AFC adjustment
11. Chroma peak level (ACC) adjustment
12. Pilot burst signal level adjustment
13. AFC shift adjustment
14. Pilot burst frag adjustment
15. Burst frag adjustment

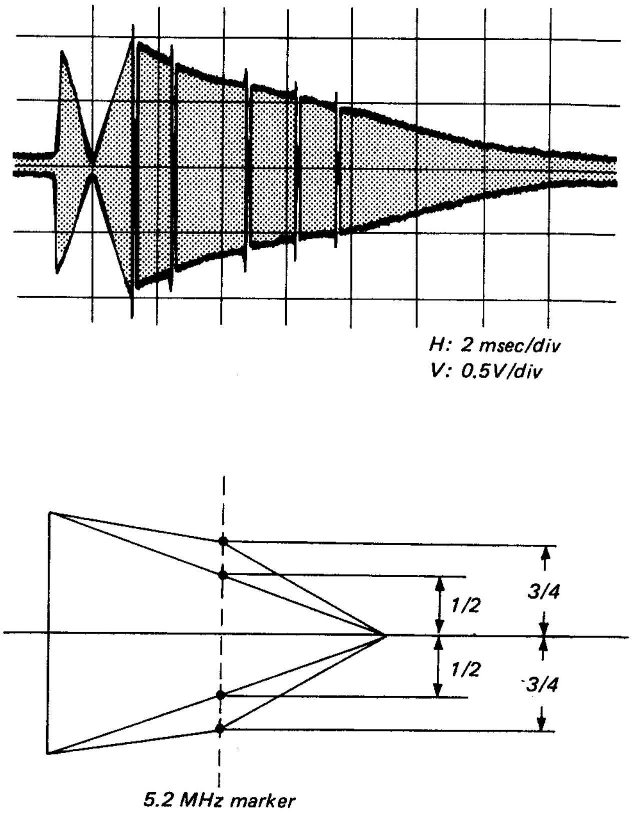
5-4-1. Playback System Alignment

1) Playback Frequency Characteristic Adjustment (SF-5 Board)

Mode: Playback
Signal: Alignment tape RF sweep
Oscilloscope: Pin③ of CN3
External trigger: Pin⑤ of CN3

[Adjustment method]

A-CH RV1
B-CH RV3
CH balance RV2



Adjust the amplitude at a frequency of about 5.2 MHz until an amplitude of between 1/2 and 3/4 of the maximum value is achieved.

Fig. 5-4-1. Playback amplifier frequency characteristic adjustment

Note:
- If the characteristic shown in Fig. 5-4-1 can not be obtained by the adjustment of RV1 or RV3, the amplitude at around 4 MHz can be increased when L8 (6.8μH . . . A-CH) or L9 (6.8μH . . . B-CH) in REC/PB AMP BLOCK is replaced by 10μH (1-407-157-11 or 1-407-190-11).
- The reason for the difference (imbalance) of waveform between A-CH and B-CH is the difference in the impedance of the head systems resulting from the difference in the winding diameters of the rotary transformers.

2) Playback Video Level Adjustment (SF-5 Board, MA-3 Board)
Mode: Playback
Signal: Alignment tape colour bar
Oscilloscope: Pin ㉕ of CN802 on MA-3 board

[Adjustment method]

i) Adjust to 1.0V ± 0.05 Vp-p with RV9 on SF-5 board.

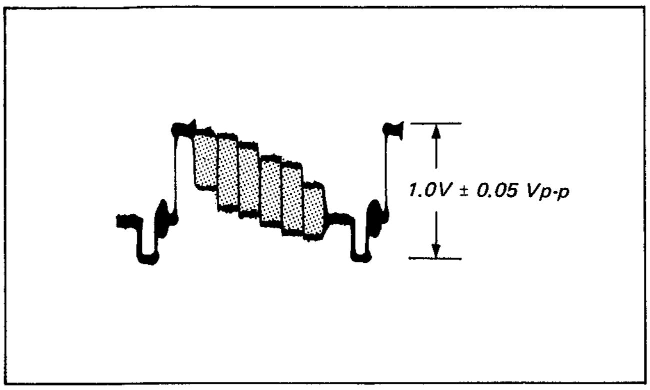


Fig. 5-4-2. Playback video level adjustment

3) Y-Comb and DOC Level Adjustment (SF-5 Board)
Mode: Playback
Signal: Tape with dropouts

Adjust while observing the monitor TV screen.

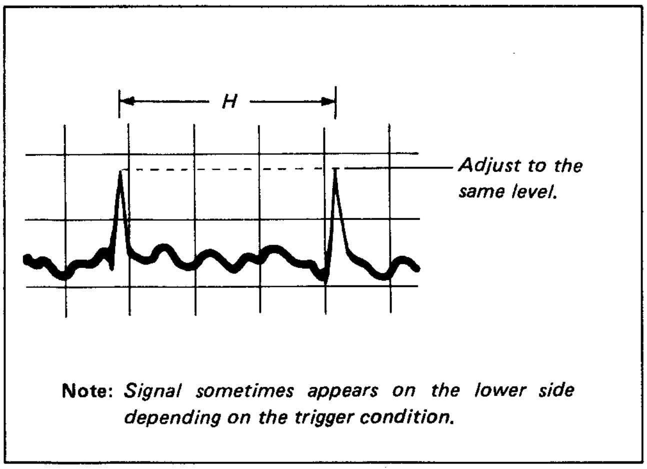
[Adjustment method]

i) Turn RV10 (Y-COMB) to eliminate dropouts, and then turn RV7 so that white dot noise just appears at the compensating section.

4) Shift Adjustment (MA-3 Board)
Mode: Playback
Signal: Alignment tape colour bar
Oscilloscope: Pin ⑫ of IC6

[Adjustment method]

i) Align the signal level (per 1H) with RV7.

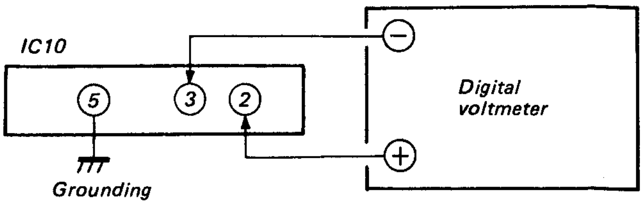


Note: *Signal sometimes appears on the lower side depending on the trigger condition.*

Fig. 5-4-3. Shift adjustment

5) Expand Adjustment (SF-5 Board)
Mode: Playback
Signal: Colour bar

Digital voltmeter:



[Adjustment method]

i) Adjust to 0.345V ± 0.01 Vdc with RV8.

6) Chroma Comb Filter Adjustment (SF-5 Board)
Mode: Playback
Signal: Alignment tape colour bar

Adjust while observing the monitor TV screen.

[Adjustment method]

i) Turn RV13 and LV1 alternately to obtain a smooth picture.

7) Converter Balance Adjustment (SF-5 Board)
Mode: Playback
Signal: Alignment tape colour bar

Adjust while observing the monitor TV screen.

[Adjustment method]

i) Minimize beats with RV14.

8) White Peak Clip Adjustment (MA-3 Board)

Use an AC adapter for adjustment because, in the case of the TT unit, power is not supplied to the RF-modulator.

Mode: Stop
Test signal switch: ON
Oscilloscope: Pin ⑰ of IC8

[Adjustment method]

i) Turn RV6 and set it to just before the waveform clips.

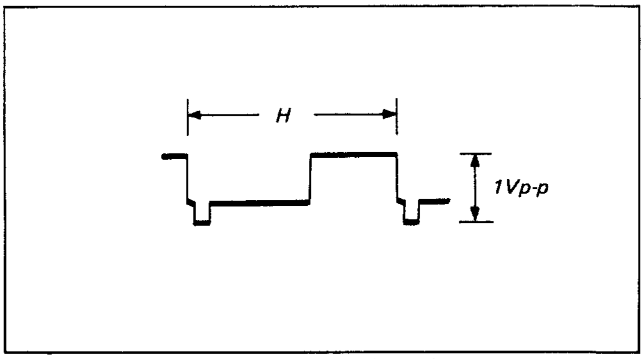


Fig. 5-4-4. White peak clip adjustment

5-4-2. Slow Motion Playback System Alignment

1) JOG AFC Adjustment (MA-3 Board)
   - Threading without cassette tape

   Mode: Playback
   Counter: Pin ⑮ of IC7

[Adjustment method]

i) Adjust to 15.625 kHz ± 0.1 kHz with RV5.

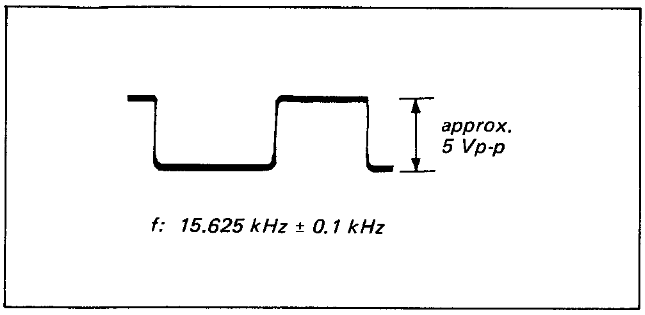


Fig. 5-4-5. JOG AFC adjustment

2) JOG Level Adjustment (MA-3 Board)

   Mode: Playback
   Signal: Self-recorded tape
   Oscilloscope: Pin ㉕ of IC5

[Adjustment method]

i) Make a note of the output at normal PB time. (Approx. 600 mVp-p)
ii) Press the PAUSE button to set STILL mode.
iii) Equalizer the level at STILL time to the level at normal PB time with RV4.

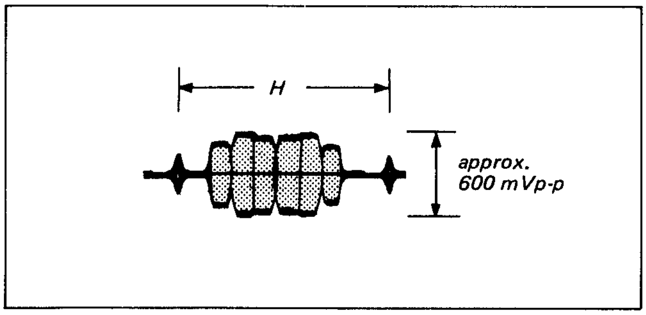


Fig. 5-4-6. JOG level adjustment

5-4-3. Record System Alignment

1) Sync and Peak AGC Adjustment (MA-3 Board)

   Mode: Record
   Oscilloscope: Pin 25 of CN802 (Accessory Connector)
   Signal: B/W

[Adjustment method]

i) Turn RV1 fully counterclockwise (↺) as seen from the pattern side. (Peak AGC off)
ii) Adjust to 1 Vp-p with RV3.
iii) Turn RV1 clockwise (↻) and set it so that the output level just starts to lower.

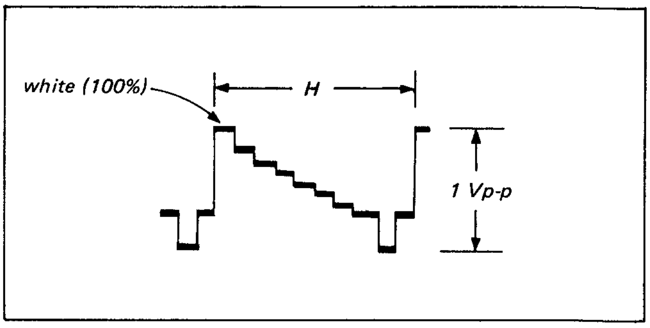


Fig. 5-4-7. Sync and peak AGC adjustment

2) Carrier Set Adjustment (SF-5 Board)

   Mode: Record
   Signal: Colour bar
   Spectrum analyzer: TP1

[Adjustment method]

i) Adjust the sync tip section to 3.8M ± 0.04 MHz with RV5.

3) Deviation Adjustment (MA-3 Board, SF-5 Board)

   Mode: Record
   Signal: Colour bar
   Spectrum analyzer: TP1 of SF-5 board

[Adjustment method]

i) Adjust the white peak section to 5.2M ± 0.04 MHz with RV2 on MA-3 board.

4) Y Record Current Adjustment (SF-5 Board)

   Mode: Record
   Signal: Colour bar
   Oscilloscope: Center of RV18

[Adjustment method]

i) Adjust to 300 mV ± 20 mVp-p with RV18.

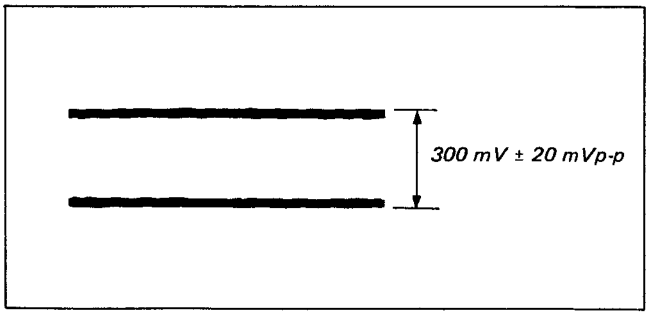


Fig. 5-4-8. Y record current adjustment

5) Chroma Reference Frequency Adjustment (SF-5 Board)
Mode: Record
Signal: None
Counter: (Pin ⑬ of IC6) TP4

[Adjustment method]

i) Adjust to 4.433619 MHz ± 5 Hz with CV001.

6) Chroma Current Adjustment (SF-5 Board)
Mode: Record
Signal: Colour bar
Oscilloscope: Q5 collector

[Adjustment method]

i) Adjust to 260 mV ± 20 mVp-p with RV17.

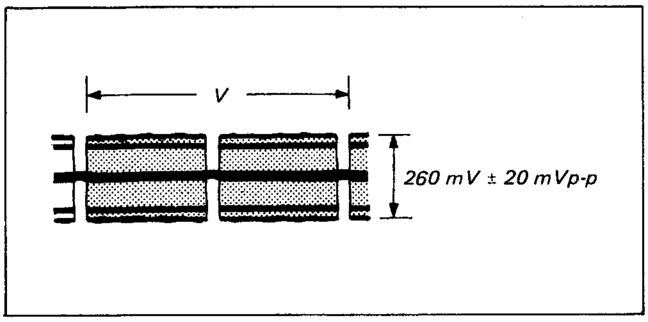
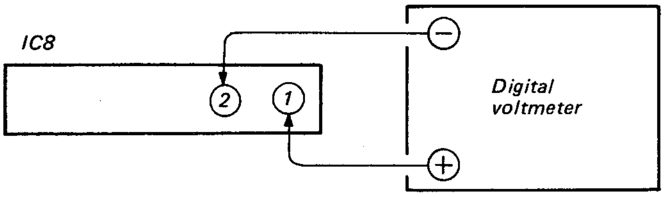


Fig. 5-4-9. Chroma current adjustment

7) Compress Adjustment (SF-5 Board)
Mode: Record
Signal: Colour bar
Digital voltmeter:



[Adjustment method]

i) Adjust to 0.3V ± 0.01 Vdc with RV2.

8) Dark Clip Adjustment (SF-5 Board)
Mode: Record
Signal: Colour bar
Digital voltmeter: Center of RV3

[Adjustment method]

i) Adjust to 2.1V ± 0.05 Vdc with RV3.

9) White Clip Adjustment (SF-5 Board)
Mode: Record
Signal: Colour bar
Digital voltmeter: Center of RV4

[Adjustment method]

i) Adjust to 2.25V ± 0.05 Vdc with RV4.

10) Chroma AFC Adjustment (SF-5 Board)
Mode: Record
Signal: None/Colour bar signal
Counter: Pin ① of IC7

[Adjustment method]

i) Under the condition of no signal input, adjust to 4.8 MHz ± 0.1 MHz with RV12.
ii) Next, input a colour bar signal, and make sure that adjustment to 5.5 MHz ± 0.2 MHz has been made.

11) Chroma Peak Level (ACC) Adjustment (SF-5 Board)
Mode: Record
Signal: Colour bar
Oscilloscope: Pin ① of IC5

[Adjustment method]

i) Adjust to 700 mV ± 5 mVp-p with RV16.

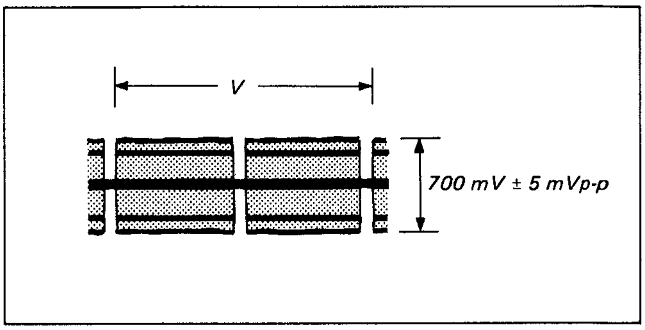


Fig. 5-4-10. Chroma peak level (ACC) adjustment

12) Pilot Burst Signal Level Adjustment (SF-5 Board)
Mode: Record
Signal: Colour bar
Oscilloscope: Pin ⑪ of IC7

[Adjustment method]

i) Align the pilot burst signal with the chroma signal level using RV15.

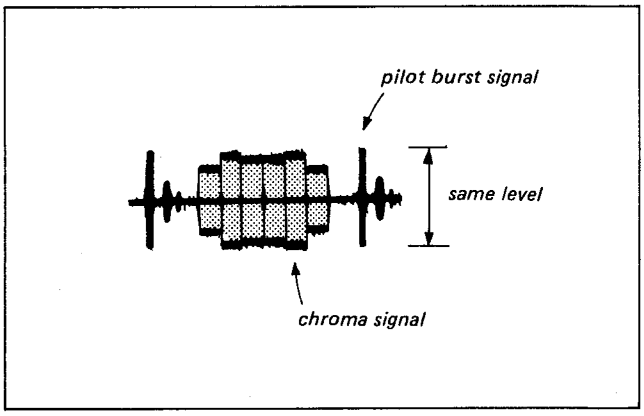


Fig. 5-4-11. Pilot burst signal level adjustment

13) AFC Shift Adjustment (SF-5 Board)
Mode: Record
Signal: Colour bar
Oscilloscope: Pin③ of IC7

[Adjustment method]

i) Adjust the DC-OFFSET to zero with RV11.

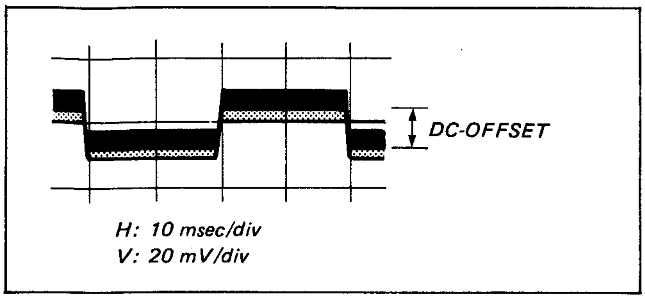

DC-OFFSET
H: 10 msec/div
V: 20 mV/div

Fig. 5-4-12. AFC shift adjustment

14) Pilot Burst Flag Adjustment (SF-5, SF-6 and MA-3 Boards)
Mode: Record
Signal: Colour bar
Oscilloscope: CH-1: Pin ㉕ of CN802 on MA-3 board
CH-2: Pin⑥ of IC5 on SF-5 board

[Adjustment method]

i) Adjust as follows with RV101 on SF-6.

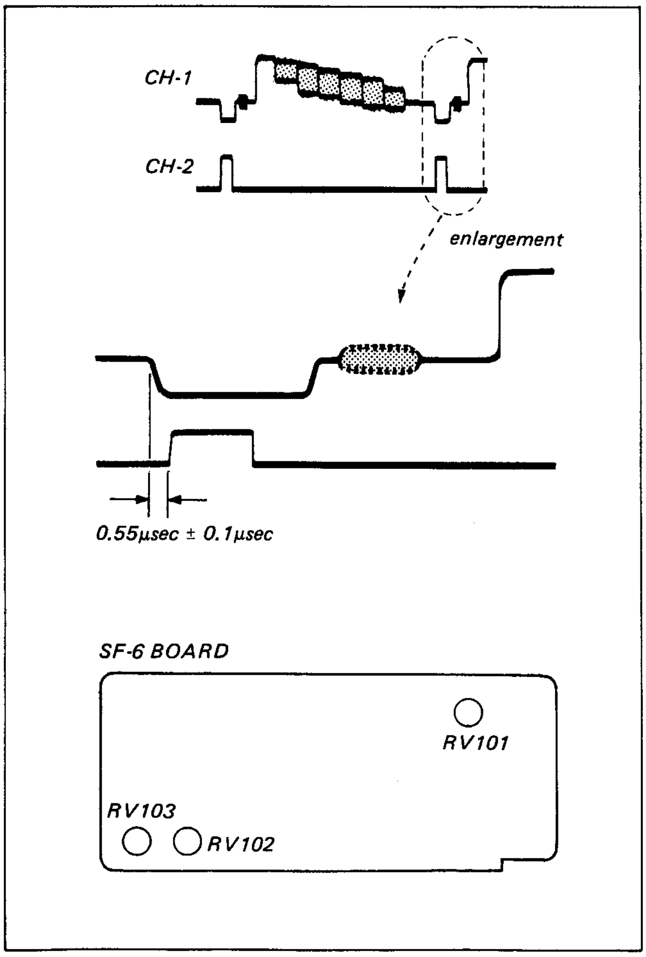

CH-1
CH-2
enlargement
0.55μsec ± 0.1μsec
SF-6 BOARD
RV101
RV103
RV102

Fig. 5-4-13. Pilot burst flag adjustment

15) Burst Flag Adjustment (SF-5, SF-6 and MA-3 Boards)
Mode: Record
Signal: Colour bar
Oscilloscope: CH-1: Pin ㉕ of CN802 on MA-3 board
CH-2: Pin⑧ of IC5 on SF-5 board

[Adjustment method]

i) Adjust as follows with RV102 and RV103 on SF-6 board.

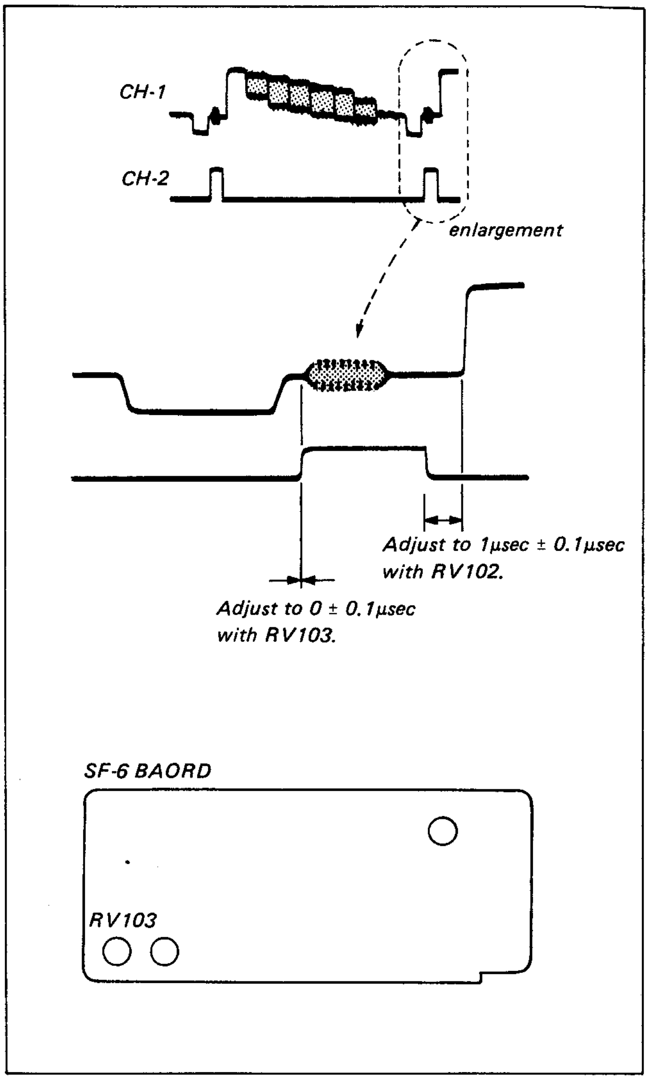

CH-1
CH-2
enlargement
Adjust to 1μsec ± 0.1μsec with RV102.
Adjust to 0 ± 0.1μsec with RV103.
SF-6 BAORD
RV103

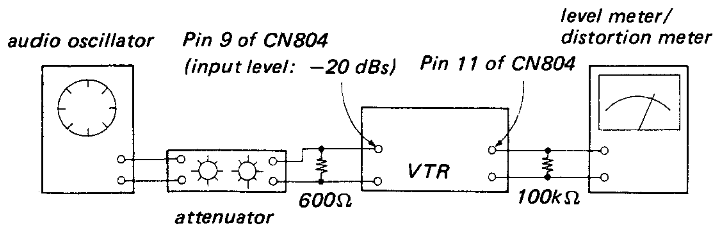
Fig. 5-4-14. Burst flag adjustment

5-5. AUDIO SYSTEM ADJUSTMENT (LS-8 Board)

Use a Dynamicron tape for adjustments.

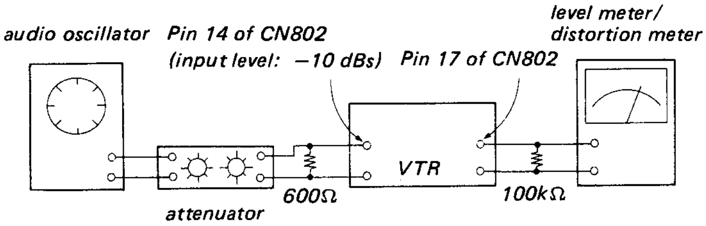
[Connection of Related Equipment]

- When using AC-F1E (AC power adaptor)


audio oscillator
Pin 9 of CN804
(input level: −20 dBs)
Pin 11 of CN804
level meter/
distortion meter
VTR
600Ω
100kΩ
attenuator

- When using TT-F1E (tuner/timer unit)

Note: Set the INPUT SELECT switch on LINE.


audio oscillator
Pin 14 of CN802
(input level: −10 dBs)
Pin 17 of CN802
level meter/
distortion meter
VTR
600Ω
100kΩ
attenuator

[Adjustment Sequence]

1. ACE head adjustment . . . See "Mechanical Adjustment"
2. Playback frequency characteristic adjustment
3. Playback output level adjustment
4. Bias oscillator check
5. Bias trap adjustment
6. Record bias adjustment
7. Record current adjustment
8. Audio dubbing bias adjustment and check
9. Overall frequency characteristic check

*10. AGC output check
*11. Overall S/N check
*12. Overall distortion check

Note: The adjustment items marked * are for AC-F1E and TT-F1E for which the input level is different.

1. **ACE Head Adjustment**
   Refer to "Mechanical Adjustment"

2. **Playback Frequency Characteristic Adjustment**
   (1) Play back 333 Hz and 5 kHz from the alignment tape and adjust so that the level difference between 333 Hz and 5 kHz is within 0 dB ± 1 dB with RV001.

3. **Playback Output Level Adjustment**
   (1) Play back 333 Hz from the alignment tape and adjust so that the output level is −25 dB ± 1 dB with RV002.

4. **Bias Oscillator Check**
   (1) Set the input signal level to zero and set up the RECORD mode.
   (2) Connect a frequency counter to TP006. The reading should be 65 kHz ± 6.5 kHz. (See Fig. 5-5-1)

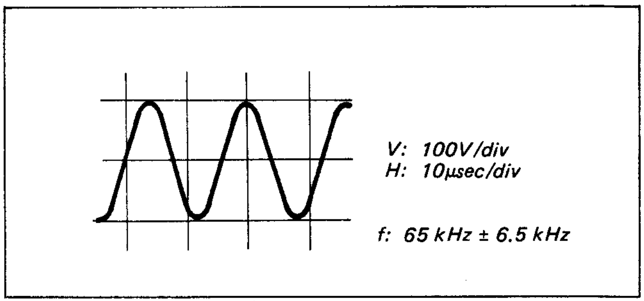


Fig. 5-5-1. Bias oscillator check

5. **Bias Trap Adjustment**
   (1) Set the input signal level to zero and set up the RECORD mode.
   (2) Connect an oscilloscope to TP005.
   (3) Adjust LV001 for minimum bias leak.
   Value: minimum level below 1.0 Vp-p. (See Fig. 5-5-2)

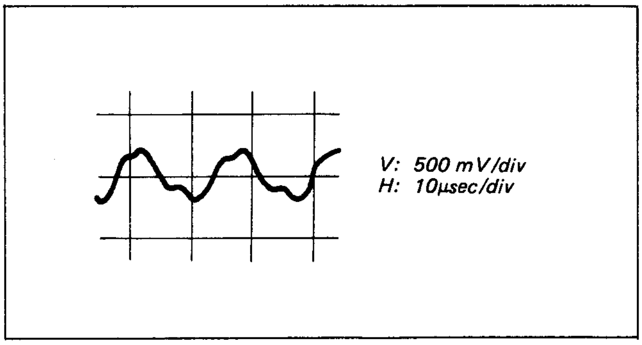


Fig. 5-5-2. Bias trap adjustment

6. **Record Bias Adjustment**

Check that "Playback frequency characteristic adjustment" has been made.

(1) Connect TP007 and TP004 (GND) with a jumper wire so as to turn off the AGC operation.
(2) Supply a 333 Hz signal.
(3) Set up the E-E mode and adjust the oscillator output level so that the level meter reading is −25 dB.
(4) Record signals.
(5) Supply a frequency of 7 kHz and perform Steps (3) and (4) above.
(6) Play back the recorded section of the tape and check that the output level at 7 kHz is ±1 dB relative to the output level at 333 Hz. If the level is outside this range, repeat Steps (2) through (5) adjusting with CV001 until the standard is met.
(7) Remove the jumper wire after making the adjustment.

7. **Record Current Adjustment**

(1) Connect TP007 and TP004 (GND) with a jumper wire so as to turn off the AGC operation.
(2) Supply a 333 Hz signal.
(3) Set up the E-E mode and adjust the oscillator output level so that the level meter reading is −5 dB.
(4) Record signals.
(5) Play back the recorded section of the tape and check that the output level is −5 dB ± 1 dB. If the level is outside this range, repeat Steps (2) through (4) above adjusting with RV003 until the standard value is obtained.
(6) Verify that the record current adjustment has been completed.
(7) Remove the jumper wire after making the adjustment.

8. **Audio Dubbing Bias Adjustment and Check**

(1) Connect TP007 and TP004 (GND) with a jumper wire so as to turn off the AGC operation.
(2) Supply a 333 Hz signal.
(3) Set up the E-E mode and adjust the oscillator output level so that the level meter reading is −25 dB.
(4) Set up the DUB mode (Depress the playback button while pressing the DUB button).
(5) Supply a frequency of 7 kHz and perform Steps (3) and (4).
(6) Play back the recorded section of the tape and check that the output level at 7 kHz is ±1 dB relative to the 333 Hz output level. If the level is outside this range, repeat Steps (2) through (5) adjusting with LV002 until the standard value is obtained.
(7) Remove the jumper wire after making the adjustment.

9. **Overall Frequency Characteristic Check**

(1) Connect TP007 and TP004 (GND) with a jumper wire so as to turn off the AGC operation.
(2) Connect a 333 Hz signal.
(3) Set up the E-E mode and adjust the oscillator output level so that the level meter reading is −25 dB.
(4) Record signals.
(5) Change the frequency to 50 Hz, 100 Hz, 5 kHz and 7 kHz and repeat Steps (3) and (4).
(6) Play back the recorded section of the tape and verify that the level is within the specification. (See Fig. 5-5-3).

Standard values: With reference to the 333 Hz playback output level.

$$50\text{ Hz}^{+2.5}_{-12}\text{ dB}$$

$$100\text{ Hz}^{+2.5}_{-3.5}\text{ dB}$$

$$5\text{ kHz}^{+2.5}_{-3.5}\text{ dB}$$

$$7\text{ kHz}^{+2.5}_{-3.5}\text{ dB}$$

$$10\text{ kHz}^{+2.5}_{-15}\text{ dB}$$

(7) If the specified values cannot be attained, perform 2 again. "Playback Frequency Characteristic Adjustment" and 6. "Record Bias Adjustment".
(8) Remove the jumper wire after making the adjustment.

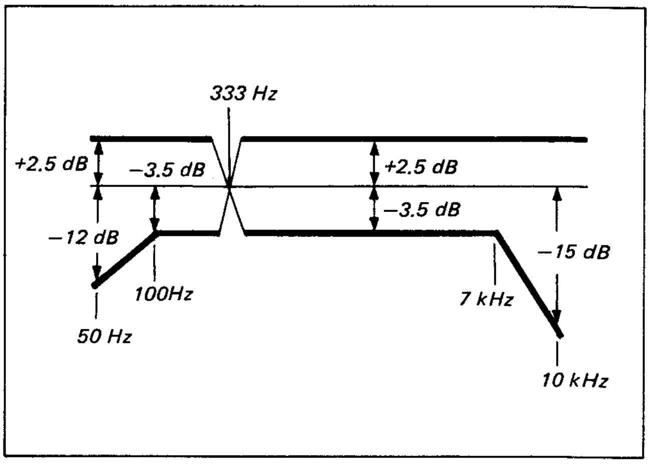


Fig. 5-5-3. Overall frequency characteristic

10. **AGC Output Check**

(1) Connect a 333 Hz signal at −20 dBs for AC-F1E and at −10 dBs for TT-F1E.
(2) Record signals.
(3) Play back the recorded section of the tape and check that the output level is −5 dB ± 2 dB.

11. **Overall S/N Check**

(1) Set the input signal level to zero and record signals.
(2) Supply a 333 Hz signal at −20 dBs for AC-F1E and at −10 dBs for TT-F1E.
(3) Record signals.
(4) Play back the recorded section of the tape and check that the output level difference is greater than 40 dB.

12. **Overall Distortion Check**

(1) Supply a 400 Hz signal at −20 dBs for AC-F1E and at −10 dBs for TT-F1E.
(2) Record signals.
(3) Play back the recorded section of the tape and verify that the distortion is below 4%.

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